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DISEASES CAUSED BY BACTERIA AND FUNGI.

MINETT, F. C. (1935). **Differentiation of *Str. pyogenes* from Man and Animals by the Sorbitol-Trehalose Test.**—*J. Path. Bact.* **40.** 357-364. 2 tables. [18 refs.]

The test was applied to 69 strains of *Str. pyogenes*, of which 19 were derived from man and 50 from the lower animals, including 21 from cows' milk. The streptococci from man were of human type as regards their effect on sorbitol and trehalose. Of 14 strains from horses, ten were of animal type, two belonged to the group known as *Str. equi* (failing to ferment lactose, sorbitol and trehalose) and two behaved like human strains. Judging from a methylene blue reduction test, however, these two strains were probably of animal type. Of the strains from milk, 18 were of animal and three of human type. The evidence goes to show that these three strains were originally of human origin and had been implanted in the udder. Streptococci from dogs, cats, ferrets and a tiger were also examined and many of these were peculiar in that they fermented neither sorbitol nor trehalose. Lactose, however, was fermented.

Trehalose-fermenting strains could not be induced to attack sorbitol by residence in the cow's udder or by serial transfer in milk containing mastitis secretion. The sorbitol-trehalose test appears to be a simple method of much value in establishing the original source of *Str. pyogenes* when present in milk.

EDWARDS, P. R., & BROH-KAHN, R. (1934). **A Note on the Hydrolysis of Sodium Hippurate by the Hemolytic Streptococci.**—*J. Bact.* **27.** 535-538. [8 refs.]

The authors were unable to confirm the statements of KLIMMER, HAUPT and ROOTS [(1928). *Zlb. Bakt. I.* (*Orig.*). **107.** 206.] that the sorbitol-fermenting, low acid-producing streptococci of horses constantly hydrolyze sodium hippurate. They examined 35 strains of low acid-producing haemolytic streptococci of animal origin, mostly from horses and, for comparison, 19 strains of human origin using the method of Klimmer and Haupt [(1926). *Zlb. Bakt. I.* (*Orig.*). **101.** 126]. Five of the animal strains and three of the human strains gave evidence of having hydrolyzed extremely small amounts of hippurate. Two strains received from KLIMMER and HAUPT did, it is true, hydrolyze hippurate but these produced a pH of 4·4 in glucose broth, fermented both trehalose and sorbitol, reduced litmus and coagulated milk, and were thus in many ways more closely related to *Str. agalactiae* than to the low acid streptococci used by the authors. [These results

serve to emphasize the conclusions already reached by most workers on streptococci that the trehalose and sorbitol tests are not primary tests, but are only of value in pointing to the probable origin (human or bovine) of actively haemolytic streptococci which do not hydrolyze sodium hippurate and do not depress the pH of glucose broth below 4·8 to 5·0].—A. W. STABLEFORTH.

HOPKIRK, C. S. M. (1934). **Consideration of the Lactiferous Duct in Mastitis of Dairy Cows.**—*Aust. vet. J.* **10.** 143-145. [1 ref.]

The presence of leucocytes and cocci in milk may not always be due to inflammation of the mammary gland proper, but to infection of the lactiferous duct of the teat. Bacteriological examination of lactiferous ducts from abattoir specimens showed that usually only one type of organism was present in each duct. The organisms in the ducts of living cows were identical with those present in the milk. Five strains of streptococci became established when introduced into the ducts on swabs. The cell count of the milk was raised as in acute mastitis, but without obvious change in the quality and quantity of the milk. Leucocytes in the gravity cream increased when the introduced organisms became established and decreased when the organisms were destroyed. The work suggests that duct infection is a precursor to mastitis.—W. I. B. BEVERIDGE.

STECK, W. (1935). **The Diagnosis of [Bovine Streptococcal] Agalactiosis.**—*Cornell Vet.* **25.** 6-21. [35 refs.]

Recent work has shown that chronic catarrhal conditions of the udder, which have little tendency to heal spontaneously, are caused by *Streptococcus agalactiae.* This organism may be suspected if flocculi appear in the milk at intervals over a period of some weeks without a marked reduction in milk yield.

A microscopic examination of the milk sediment may be sufficient for the recognition of the causative organism. Smears showing leucocytosis and intracellular bacilli are characteristic of infection with pathogenic streptococci. Latent infections, however, cannot be determined in this manner and the isolation of the bacillus must be attempted. A simple technique is the addition of 0·5 c.c. of milk to serum-dextrose agar in narrow tubes. After 12 hours' incubation any colonies present are usually streptococci. The organism ferments lactose.—F. BLAKEMORE.

UDALL, D. H., & JOHNSON, S. D. (1935). **Report on a Herd under Mastitis Control.**—*Cornell Vet.* **25.** 57-59. 1 table.

The authors describe a simple method for controlling streptococcic mastitis in a herd. This consisted of preliminary grouping, discriminate machine milking and the use of a chlorine solution for disinfecting milking cups and teats ; no laboratory tests were applied. The productive power of the herd was enhanced and the fat content and total milk yield were substantially increased from the owner's own estimation.—A. L. MULLEN.

HUCKER, G. J., & HANSEN, P. A. (1934). **The Bacteriology of Chronic Mastitis.**—[Copied *verbatim* from *J. Bact.* **27.** 73].

A résumé has been prepared of the investigations on udder infections carried on at the New York State Agricultural Experiment Station. During the past 5 years over 125 autopsies have been performed and the results correlated with a laboratory examination of the milk secured prior to post mortem. In addition, regular quarter samples have been examined from over 200 cows over a period of two years. The history of each individual has been followed by coöperating clinicians.

The results of these studies indicate the prevalence of chronic or subclinical mastitis as well as the significance of the laboratory examination of milk in the detection of abnormal udders.

A detailed study has also been completed pertaining to the types of streptococci present in the udder and the relation of leucocytes in the milk to the presence of udder infection.

WALL, S. (1934). Diplokockjuverninflammation hos ko. [**Diplococcal Mastitis**]. —*4. Nord. Vet.-mötet. Helsingfors, 1933.* pp. 626-675. 10 figs., 10 tables. [9 refs.] [English summary : abst. from orig.] [A German version appears in *Verh. dtsch. path. Ges. 27. Tagung.* pp. 233-241 and 259-261].

The author first gives an account of the incidence of the different types of mastitis examined at the Institute of Bacteriology, Stockholm, during the years 1931 and 1932. Of 2,059 cases, 1,568 (75 per cent.) were of streptococcal origin. The organism isolated from many of these cases is, however, often non-pathogenic both for mice and for cows, when introduced *via* the teat canal. The author concludes that it is impossible for these organisms to be the real cause of the inflammation in many of the cases now regarded as streptococcus mastitis, but that they are merely of secondary importance.

At the same institute, HEDSTRÖM (1929) isolated from the udder of an affected cow a diplococcus, which has temporarily been called *Diplococcus* M. This organism has proved to be highly pathogenic both for mice and cows. When inoculated subcutaneously, the mice die from septicaemia within 24 hours. Cows infected *via* the milk sinus develop a mastitis which, as regards symptoms and course, bears a striking similarity to the natural acute disease. This organism must, therefore, be regarded as the cause of the inflammation set up in the udder from which it was isolated and is probably the cause of many cases of mastitis in cows. This conclusion is supported by the fact that vaccination against the infection in herds suffering from contagious mastitis has proved to be of preventive value. The organism under consideration is smaller than a common staphylococcus. In smears from the spleens of mice artificially infected it appears in pairs, often enveloped in capsules. In secretions from the udder it occurs both in pairs and in chains, and in broth medium in chains only. The organism grows well on artificial media, and the growth may be accelerated by addition of serum : broth remains clear, but a slight sediment may be seen ; on blood agar, the organism appears to be strongly haemolytic. A table is given showing the fermentation properties. When experimentally infected, the cows react in most cases with systemic disturbances such as pyrexia, lowered appetite, etc. Locally the lesions are found to be a purulent catarrh on the lining of the milk sinus and milk-producing system. In acute cases, the lesions display a great tendency to heal with atrophy of the cells and formation of connective tissue. This healing process may be hastened by frequent milking out (five times a day). No other treatment is recommended. The results of this simple method of treatment have been found to be in accordance with those of KLEIN, who reports the recovery of 84 per cent. of the animals within a week. In some cases, the causal organism may be eliminated from the udder comparatively quickly ; in others, however, it remains there and may sooner or later set up a renewed infection.

Certain rules for combating the disease and concerning the fitness of the milk for consumption are given. In an appendix to the paper, there are some photomicrographs showing the diplococcus and the pathological changes caused by it in the udder tissue.—GUSTAV NAERLAND (FARSUND).

REGNÉR, G. (1934). De nya tuberkulosförfattningarna. **[New Regulations on Bovine Tuberculosis—Sweden].**—*Svensk. VetTidskr.* **39.** 367-378.

In this article the author discusses some newly enacted governmental regulations concerning the control of bovine tuberculosis in Sweden, and makes a detailed comparison of these new regulations with the old ones. The result appears to be that the Government has now undertaken to give greater pecuniary support in combating the most dangerous (open) forms of bovine tuberculosis. Thus, in addition to udder tuberculosis, the clinical appearance of tuberculous infection of the genital organs has been included in those cases in which slaughter is compulsory. A survey is given of the conditions, particularly those differing from the previous ones, under which compensation is obtainable.—GUSTAV NAERLAND (FARSUND).

TORRANCE, H. L. (1935). **The Control of Bovine Tuberculosis.**—*Vet. Rec.* **15.** 114-116.

In this article information gained from an examination of a number of cases of tuberculous mastitis is used in order to evolve an inexpensive method of control. Of 223 cows affected with tuberculosis of the udder, only 21 were first or second-calf cows and it is demonstrated that a practicable scheme would be to establish self-contained herds of first and second-calf cows, the milk from these to be checked by veterinary inspection and biological examination. It is pointed out that the original incidence of tuberculosis would be small in such herds, that it would tend to decrease and that the tuberculin test could be resorted to after a period of two years, when the reactors would be comparatively few.—JOHN REID.

VIRDIS, F. (1934). Recherche, à Parme, du bacille de la tuberculose chez les bovins et dans le lait. **[Bovine Tuberculosis at Parma].**—*G. Clin. med.* No. 1. p. 31. [Abst. from abst. in *Bull. Off. int. Hyg. publ.* **26.** 2034-2035].

The author found that of the bovines slaughtered at the abattoirs at Parma, 17·76 per cent. of the cows and 2·18 per cent. of the bullocks were tuberculous. Infection seems to have gained ground between 1927 and 1932. The infection percentage of samples of market milk examined was 5·4.—J. E.

AMMAN, K. (1934). Beitrag zur Augentuberkulose des Rindes. **[Ocular Tuberculosis of Cattle].**—*Tierärztl. Rdsch.* **40.** 529-532 and 575-580. 9 figs., 1 table. [22 refs.]

Seven cows of the Swiss Brown breed, of ages ranging between two and ten years, were found to be suffering from ocular tuberculosis. In three cases the whole eyeball was involved and in four cases there was an iridocyclitis, in one instance combined with a choroiditis. Tubercle bacilli were identified in six instances; in the seventh, diagnosis was based upon histological changes. On the basis of their own investigations, as well as those of other workers, the author considered that tuberculosis within the eyeball in the bovine is always secondary to other lesions, infection spreading by the blood or lymph streams. Direct infection of the eye does not seem to occur in nature.—E. J. PULLINGER.

I. HERMANSSON, K. A. (1934). Ett fal av tuberkulos hos föl. **[Tuberculosis in a Foal].**—*Skand. VetTidskr.* **24.** 586-591. 4 figs. [English summary: abst. from orig.]

II. HERMANSSON, K. A. (1935). Ein Fall von Tuberkulose bei Fohlen. **[Tuberculosis in a Foal].**—*Z. Fleisch- u. Milchhyg.* **45.** 246-248. 4 figs.

III. HERMANSSON, K. A. (1935). Ein Fall von Tuberkulose bei Fohlen. **[Tuberculosis in a Foal].**—*Arch. wiss. prakt. Tierheilk.* **68.** 407-408. 2 figs.

I. In this article the author describes a case of tuberculosis in a foal caused by feeding partly on milk from a cow suffering from tuberculosis of the udder. The foal was slaughtered when one year old, in a highly emaciated condition. Tuberculous ulcers were found in the mucous membrane throughout the intestines and foci were also present in the mesenteric glands, liver glands and glands of the lungs. Miliary tuberculosis in the lungs and multiple nodules in the spleen were observed. The author states that this case supports the statement of BANG (Copenhagen) and of the British Royal Commission on Tuberculosis, that tuberculosis in horses is most commonly caused by the bovine type of organism, and not by the human or avian type, as has been suggested.

II. A fairly full summary of I.

III. A condensed version of I.—GUSTAV NAERLAND (FARSUND).

FRÖHLICH, A. (1933). Beitrag zur Kasuistik der Geflügeltuberkulose beim Schwein. [**Avian Tuberculosis in Swine**].—*Z. Fleisch- u. Milchhyg.* **44.** 89-91 and 103-106. [16 refs.]

Careful search for tubercle bacilli was made in the carcasses of 20 tuberculous pigs by cultural means as well as by inoculation of guinea pigs and fowls with tissue extracts. Only two of these pigs were infected with the avian type of organism. This is a considerably lower percentage of infection of swine with avian tuberculosis than the 39 per cent. noted by VON HELM [(1928). *Arch. wiss. prakt. Tierheilk.* **57.** 230]. VON HELM's figure was estimated as a result of the examination of a very large group of pigs. The technical procedure and results of the above investigation are noted in detail.—E. J. PULLINGER.

SMITH, H. R. (1935). **The Significance of the Avian Tuberculosis Problem.**—*J. Amer. vet. med. Ass.* **86.** 381-389.

This is a general survey of the avian tuberculosis problem in the United States. An organized campaign should be waged against the disease as this would result in :– (1) an increase in the prosperity of the poultry industry ; (2) the removal of a serious loss to the pig industry, and (3) the elimination of the confusion that exists in the tuberculin testing of cattle caused by infection with avian strains of the tubercle bacilli.

It is generally agreed that the most economical method of eradicating the disease from a commercial flock is to dispose of fowls at the end of the first season : if this method is practised for a number of years the disease will gradually die out. In valuable flocks the tuberculin test should be applied.—T. M. DOYLE.

VALTIS, J., PAISSEAU, G., & VAN DEINSE, F. (1935). Isolement, de l'expectoration d'un enfant, de bacilles présentant les caractères " aviaires " et " mammifères ". [**Isolation of Mammalian and Avian Tubercle Bacilli from the Sputum of a Child**].—*C. R. Soc. Biol. Paris.* **118.** 514-516.

From the sputum of a six-year-old child two different cultures of *Mycobact. tuberculosis* were isolated. One culture presented the general characteristics of the avian type, the other proved to be a mixture of avian and eugonic mammalian. It does not appear to be clear whether the mammalian type should be designated as a human or a eugonic bovine type, as on Löwenstein's medium it grew as a human type, but as a bovine type on Sauton's medium. Brief details of pathogenicity are given.—R. LOVELL.

I. FELDMAN, W. H. (1934). **The Susceptibility of Chickens to Human and Bovine Tubercle Bacilli.**—*Amer. Rev. Tuberc.* **29.** 400-414. 1 fig., 6 tables. [15 refs.]

II. FELDMAN, W. H. (1934). **Pathological Changes Induced in Chickens by Human and Bovine Tubercle Bacilli.**—*Ibid.* 415-423. 6 figs. on 1 plate. [2 refs.]

I. Using the intracerebral route of inoculation, a strain of *Mycobact. tuberculosis* of bovine origin was passaged through chickens for five generations.

Tubercle bacilli of the human and bovine types present in the lesions in chicken tissues soon become non-viable and disintegrate.

Fowls inoculated with the strains of bacilli under investigation develop an allergic state which can be demonstrated by the intracutaneous injection of mammalian tuberculin and, occasionally, avian tuberculin also.

II. From the results of the experiments, the conclusion is drawn that chickens are extremely resistant to the human and bovine strains of the tubercle bacillus. Chickens were inoculated intracerebrally and intravenously with the human and bovine strains of the bacillus and a histological study made of the lesions found in the brain, liver and spleen.

The cytological reaction was that of a definitely tuberculous process, characterized by the occurrence of follicular accumulations of epithelioid cells. After a certain stage of progression, the lesions became quiescent and tended eventually to disappear. In no instance did the infective material cause an aggressive malignant form of the disease.

The author does not consider it possible for a widely disseminated outbreak of tuberculosis in poultry to occur as a result of infection with the human or bovine strains of *M. tuberculosis*.—NORMAN DOBSON.

SAENZ, A., SADETTIN, M., & COSTIL, L. (1935). Différenciation des bacilles tuberculeux des mammifères, des bacilles paratuberculeux et des streptothricées, révélée par l'étude de la toxicité comparée de l'acide sulfurique et de l'acide acétique. [**Differentiation of Mammalian Types of** *Mycobact. tuberculosis*, **of** *M. paratuberculosis* **and of** *Streptothrix* **by their Reactions to Sulphuric and Acetic Acids**].—*C. R. Soc. Biol. Paris.* **118.** 215-217. 3 tables. [4 refs.]

The authors have shown that sulphuric acid affects differently strains of *M. paratuberculosis*, streptothrices and mammalian strains of *M. tuberculosis*. There are concentrations at which, while the growth of *M. paratuberculosis* and streptothrices is prevented, cultures of *M. tuberculosis* can be obtained.

Acetic acid is very toxic for *M. tuberculosis* and the streptothrices, but it does not affect the growth of *M. paratuberculosis* in concentrations of 10 per cent.
—T. M. DOYLE.

HARNACH, R. (1934). O vyhlídkách a předpokladech aktivní imunisace proti tuberkulose. [**Immunization against Tuberculosis (BCG)**].—*Zverolék. Obz.* **27.** 286-289. [3 refs.] [Abst. from abst. in *Rev. vét. slave.* **1.** 207].

A general discussion on the practicability of BCG vaccination in calves with emphasis on the necessity of isolating inoculated animals for 30 days after injection.
—J. E.

JUNDELL, I., & MAGNUSSON, H. (1934). Fortsatta BCG-forsök å svin. [**Further Experiments with BCG in Swine**].—*Svensk VetTidskr.* **39.** 271-286. 6 tables.

The disappointing results from an earlier experiment on the efficacy of BCG vaccination in swine [this *Bull.* **2.** 485.], as well as information of similar results obtained in the United States of America [(1932). HAYES, HARING & TRAUM – this *Bull.* **3.** 461.], led the authors to repeat the experiments on a larger scale.

Altogether 41 young pigs divided into eight groups were used in the experiment. Each animal was vaccinated twice, either *per os* or subcutaneously, the first time immediately after birth and the second time about six weeks later. When the intradermal tuberculin test was applied four weeks after the first vaccination, no animal showed a positive reaction. Almost all animals, however, gave a positive reaction when tested about five weeks after the second inoculation. The animals were kept isolated from natural infection, and infected experimentally three times, the first and second times with infected udder tissue and the third time with infected milk, at the 17th, 19th, and 22nd weeks of age respectively. In no case did vaccination with BCG prevent development of tuberculous lesions, especially in the glands of the digestive system.

Uncertain, but not definitely negative, results followed an experiment with two groups of animals vaccinated on two occasions, where each animal was given two doses (1 g. each) of a culture of an avirulent strain of tubercle bacilli [not BCG vaccine] and then, later, a dose of tuberculous milk ; the experiment will be repeated. A certain degree of resistance was possibly produced by this method of treatment.—GUSTAV NAERLAND (FARSUND).

SHAFFER, M. F. (1935). **Experiments with B.C.G. Cultures.**—*J. Path. Bact.* **40.** 107-133. 32 figs. on 3 plates, 8 tables. [44 refs.]

The author has examined three strains of BCG from different sources and, by a study of single colonies, only the R type was evident. Two of the cultures were tested by inoculation and were avirulent for guinea pigs and rabbits. Attempts were made to procure S virulent variants by successive platings, animal inoculations, and by successive transfers to egg media of varying pH, to media to which filtered normal sera had been added, and to a modification of Sauton's media with and without normal sera. In no case was it possible to induce the formation of S forms with increased virulence. The injection of living BCG, R and heat-killed S organisms subcutaneously into guinea pigs failed to induce a reversion to a virulent form, neither was the method of injecting living BCG into rabbits previously immunized with heat-killed homologous organisms successful.

Two cultures of *Mycobact. tuberculosis* isolated by DREYER and VOLLUM from animals inoculated with BCG grown in the depths of broth were also examined and when plated on Petroff's medium produced only S colonies which were agglutinated in buffer solutions up to pH 3·2 to 3·4 and were moderately virulent for guinea pigs, though less so for rabbits. It was possible to obtain R variants from them, resembling BCG in appearance, by growth on an egg medium.—R. L.

PETRAGNANI, G. (1934). A la recherche d'un vaccin tuberculeux intégral et diffusible. [**A Diffusible Vaccine against Tuberculosis**].—*Boll. Sez. ital. Soc. int. Microbiol.* **6.** 432-436. [In French].

A tuberculosis vaccine introduced by the author in 1926 is said to have possessed remarkable antigenic properties and to have met with considerable experimental success at the hands of other workers. The work now described was undertaken to overcome the tendency of the vaccine to become localized at the point of inoculation. It has been shown that guinea pigs previously vaccinated with carbolized preparations of the vaccine show exceptional resistance to tuberculosis. Their use in man has, however, been discouraging owing to the extensive and disturbing clinical reaction following their use and the author describes attempts to overcome this defect. In guinea pigs a carbolized preparation, treated with formaldehyde in varying degrees of acidity, overcame the difficulty, this being supported by further work on the human subject. A second

method of obviating the severe clinical reactions by the use of solvent preparations demonstrated that acetone possessed the most promising features. The author is satisfied that acetone insoluble carbolized preparations meet with the necessary requirements.—A. L. MULLEN.

BIRKHAUG, K. E. (1935). Etudes sur la dissociation du Mycobacterium tuberculosis. Deuxième partie. [**The Dissociation of** *Mycobact. tuberculosis.* **II**]. —*Ann. Inst. Pasteur.* **54.** 195-244. 56 figs. on 13 plates, 4 tables, 3 graphs. [59 refs.] [For abst. of previous article of this series, see this *Bull.* **5.** 541].

Human, bovine and avian strains of *M. tuberculosis*, whether typical or atypical, have not fixed morphological characters, but undergo spontaneous dissociation into Ch, R and S variants. This dissociation occurs more frequently *in vivo* than *in vitro*. The S is the dominant type in avian strains and the Ch and R variants are relatively rare. The R is the dominant type in mammalian strains. None of these types are absolutely stable. *In vitro* dissociation has been brought about most frequently by incubating cultures in liquid media for a short period at 37°C. and then holding them at room temperature.

Ch and S variants grow on solid and liquid media at room temperatures (20° to 30°C.) while the R variant grows only at incubator temperature (37° to 40°C.). The utilization of glucides is essentially similar for the Ch, S and R variants of both mammalian and avian strains.

The R variants of avian and mammalian strains are more resistant to the bacteriostatic action of dyes and disinfectants than the Ch and S variants, which resist better the adverse effects of heat, light and malnutrition. The bacilli of the Ch colonies of avian and mammalian strains, and those of the avian R colonies, are generally avirulent for experimental animals. Bacilli of S colonies of mammalian strains are relatively virulent for rabbits and guinea pigs.—T. M. DOYLE.

VALTIS, J., & VAN DEINSE, F. (1934). Recherches sur les variations biologiques du virus tuberculeux. [**Biological Variations of the Tubercle Bacillus**].—*Ann. Inst. Pasteur.* **53.** 51-71. [4 refs.]

The authors have studied a series of strains of tubercle bacilli obtained from guinea pigs inoculated either with filtrates of tuberculous material or with unfiltered material and subsequently given multiple injections of an acetone extract of tubercle bacilli. This method permits of cultures being obtained from guinea pigs previously inoculated with filtrates of tuberculous material. The cultures have, on egg medium, a smooth greasy appearance, somewhat similar to that shown by avian strains of the tubercle bacilli, and their pathogenicity for guinea pigs, rabbits and fowls also approaches that of avian strains. These strains are, however, different from avian strains in that they acidify the culture media and are avirulent for the mouse and the rat.

Some of these smooth strains retain their particular cultural and pathogenic characters after serial passage through guinea pigs and rabbits ; other smooth strains change to rough as the result of guinea pig passage. In some cases, smooth and rough colonies have been obtained from the same guinea pig.

Valtis and van Deinse consider that the smooth colonies that are unchanged by animal passage represent the first stage of the organism that arises from the filtrable virus. At the other end of the scale were found strains similar in all respects to the classical human strains. The authors consider that the general custom of dividing strains of tubercle bacilli into the three categories of human, bovine and avian strains is too narrow, as there are intermediate types, and that the three recognized types are merely the result of the species adaptation of one virus – the virus of tuberculosis.—T. M. DOYLE.

SMITHBURN, K. C. (1935). **The Colony Morphology of Tubercle Bacilli. I. The Presence of Smooth Colonies in Strains Recently Isolated from Sources other than Sputum.**—*J. exp. Med.* **61.** 395-410. 11 figs. on 2 plates, 5 tables. [3 refs.]

Smithburn records the finding of smooth mucoid colonies of human tubercle bacilli which resemble the S colonies of other bacteria. In appearance they are smooth, round, shiny, non-granular and non-spreading; they were observed in cultures freshly isolated from eight human sources other than sputum.

6 per cent. H_2SO_4 or 3 per cent. NaOH is unfavourable to their development, while a slightly acid medium appeared to be favourable.—T. M. DOYLE.

BARTSCH, E. (1935). Die Tuberkelbakterienfärbung nach Osol. Ein Vergleich mit der Färbung nach Ziehl-Neelsen. [**Staining of Tubercle Bacilli**].—*Z. InfektKr. Haustiere.* **47.** 221-226. [1 ref.]

The Osol technique for staining acid-fast bacilli is as follows:– a thick smear is fixed and stained with carbol fuchsin in the usual way, the stain being warmed gently and allowed to act for two to three minutes. The smear is then decolorized with 10 per cent. sulphuric acid for ten to 14 seconds and is washed and dried gently but thoroughly with filter paper. It is then treated with a mixture of five volumes of a 10 per cent. aqueous solution of sodium sulphite (freshly prepared) and 96 per cent. ethyl alcohol. Acid-fast organisms stain red whilst the background is colourless or yellow. This technique was found to be superior to the Ziehl-Neelsen staining method, as tubercle bacilli so stained were easier to see, whilst the colourless background made the use of very thick smears possible.
—E. J. PULLINGER.

BOQUET, A. (1935). La bacillémie tuberculeuse et la dissémination bacillaire du point de vue immunologique. [**Tuberculous Bacillaemia and Immunity**].—*Rev. Immunol.* **1.** 186-198.

The author gives an account of the lesions produced by the intravenous injection of tubercle bacilli and discusses the rate at which the bacilli disappear from the blood stream. The course of the disease following subcutaneous, respiratory and digestive infection is also described. The author states that unless there is a heavy primary infection the lesions are localized and are not usually detectable by clinical methods. If a secondary infection of the blood stream does occur, the organisms are usually immobilized and destroyed by the phagocytes of the spleen, liver and bone-marrow. The power to resist infection is present in infants and increases with age; it is influenced by pregnancy, dysfunction of the endocrine glands and pathological conditions.—F. BLAKEMORE.

VALLÉE, H., RINJARD, P., & VALLÉE, M. (1934). Sur la prémunition de l'entérite paratuberculeuse des bovidés. [**Premunition against Johne's Disease**].—*Rev. gén. Méd. vét.* **43.** 777-779. [2 refs.]

The authors explain a method of premunization against Johne's disease similar to that described by H. Vallée in 1924 for tuberculosis, and say that they have used it frequently since 1922. Knowing that subcutaneous inoculation of the causal organism, even non-attenuated, was innocuous, they used 5 to 10 mg. of living culture suspended in non-absorbable excipient (liquid vaseline and ground sandstone). An inflammatory nodule is produced, which gradually becomes sclerotic, cold and insensitive. This focus of infection persists for a long time, during which the animal remains premunized against natural infection.

The authors analysed the results of this vaccination (which needs repetition

as soon as the lesion subsides through reabsorption or abscess formation). It was successful on 133 badly affected farms (5,650 animals), and partially so on 20 farms (800 animals) for which they give reasons. For the control of the disease they recommend early slaughter of infected animals in addition to this premunization.—C. V. WATKINS.

NELSON, J. B. (1935). **Studies on an Uncomplicated Coryza of the Domestic Fowl. III. The Effect of Extranasal Injection on the Growth of the Fowl Coryza Bacillus. IV. Susceptibility after Extranasal Injection of the Fowl Coryza Bacillus.**—*J. exp. Med.* **61.** 351-359 and 361-367. 5 tables. [4 refs.] [For abst. of previous articles of this series see this *Bull.* **5.** 471].

In papers I and II recording observations on an uncomplicated coryza in fowls, it was shown that intranasal inoculation, with exudate or with pure culture of a haemophilic bacillus (referred to as the " fowl coryza bacillus ") isolated from exudate, regularly produced inflammation of the nasal mucosa.

III. On extranasal inoculation the specific bacillus appears to multiply sparsely or not at all. In the case of intratracheal, intra-aural, and intra-orbital injections (points in communication with the upper air passages) the bacilli may be carried to the upper air passages and produce coryza, even in the absence of local development. Following intraperitoneal inoculation, over half the birds so injected showed the specific bacillus in the nasal passages without, except in one case, accompanying inflammation. Intravenous, subcutaneous and intracloacal injections gave negative results.

IV. Intratracheal, intracloacal and subcutaneous injections of live culture of the fowl coryza bacillus had no apparent effect on the susceptibility of fowls to coryza. Intraperitoneal injection was irregularly followed by a definite alteration in the susceptibility of the host, and growth of the specific bacillus was inhibited in the nasal tract of 70 per cent. of birds which had received a previous intraperitoneal inoculation.

[ELIOT and LEWIS record experiments in which they isolated a pleomorphic, haemophilic, Gram-negative bacterium from uncomplicated cases of coryza of the chicken – this *Bull.* **5.** 472. Intranasal inoculations of pure cultures of this organism regularly produced coryza and the bacterium could be reisolated from the infected bird].—R. F. GORDON.

WILSON, J. E., & WILSON, D. R. (1935). **An Outbreak of Fowl Cholera in Scotland.**—*Vet. J.* **91.** 57-59. 2 plates. [3 refs.]

This appears to be the first recorded outbreak of fowl cholera in Scotland and probably originated from the 1933 epizootic in Norfolk. Mortality was very high, 350 fowls dying out of 500. The symptoms and *post-mortem* lesions are described. Saline suspensions of the organism (*Pasteurella aviseptica*) in high dilution, and blood from the natural cases in a dilution of 1 : 100 were pathogenic for fowls, pigeons, rabbits, mice and guinea pigs.—R. F. GORDON.

NIKOLSKY, V. V. (1934). **Contagious Rhinitis of Rabbits. Salmonella and Pasteurella Infection.**—*Sovyet. Vet.* No. 11. pp. 53-59. [Abst. from French summary].

The author describes a group of diseases caused principally by *Salmonella paratyphi* (formerly *Bact. paratyphosum*) B and the haemorrhagic septicaemia group of bacteria. The causal organism can always be isolated from the blood and parenchymatous organs in acute cases, and from the lesions in chronic cases. Subcutaneous abscesses generally occur. This disease can occur apart from

avitaminosis, and is spread by contaminated food, etc., *via* the air passages, mouth or through the skin.—C. V. WATKINS.

HÖFFLING, R. (1934). Nitroprussidnatrium als Differenzierungsmittel innerhalb der Paratyphusgruppe. [**Sodium Nitroprusside as a Means of Differentiation between Bacteria of the Paratyphoid Group**].—*Zlb. Bakt. I.* (*Orig.*). **133.** 113-121. 5 tables. [22 refs.]

It is considered possible to differentiate *Salmonella paratyphi* (formerly *Bact. paratyphosum*) A, *S. paratyphi* B, *S. typhi-murium* (formerly *Bact. aertrycke* or *Bact. enteritidis* Breslau), *S. cholerae-suis* var. *kunzendorf* (formerly *Bact. suipestifer*, European variety, monophasic), and *S. enteritidis* (formerly *Bact. enteritidis* Gärtner) by introducing a low concentration of sodium nitroprusside into certain sugar media such as mannite, arabinose, xylose broth and rhamnose-peptone-water. [It seems preferable to differentiate by serological methods].—R. LOVELL.

DAVID, H. (1934). Paratyphusausscheider beim Tier und ihre Bedeutung für den Menschen. [**Paratyphoid Infections of Animals and their Importance for Man**].—*Wien. klin. Wschr.* **47.** 1377-1378. [Abst. from abst. in *Zlb. Bakt. I. (Ref.).* **116.** 260].

This is a plea for an official veterinary inspection of farms for the purpose of diagnosing bovine carriers of paratyphoid bacteria pathogenic for man, and for power to remove potentially dangerous animals.—J. E.

NOHMI, S., & TERAKADO, Y. (1934). **Swine Paratyphoid.**—*J. Jap. Soc. vet. Sci.* **13.** 224-236. 2 tables. [26 refs.] [Abst. from English summary].

The authors describe swine paratyphoid as it occurs in Japan. It usually attacks animals between two and six months of age, and may either be acute with a clinical syndrome resembling haemorrhagic septicaemia, or it may be chronic, lasting for as long as three months. Animals dead of the acute form show a *post-mortem* picture of septicaemia, and those dead of the chronic form show swelling of the mesenteric lymph glands, lardaceous pneumonia, haemorrhage or ulcers of the gastric mucous membrane, necrotic nodules in the liver and spleen and diphtheritic ulcers in the large intestine. The bacteria isolated from clinical cases are described in detail, and the classification of bacteria reported from the disease in Europe is discussed. The conclusion is arrived at that the Japanese organism concerned is *Salmonella typhi-suis* (Glässer) var. Voldagsen.

Agglutinin titres of the blood of affected pigs rise and fall in conformity with the clinical condition, beginning at 1 : 20 in fresh cases and rising to as much as 1 : 2,560 in well-developed acute cases. With convalescence the titre falls fairly quickly.—J. E.

QUISENBERRY, J. H., ROBERTS, E., & CARD, L. E. (1935). **Blood Studies of Strains of the Domestic Fowl, Differing in Resistance to Pullorum Disease.** —*Poult. Sci.* **14.** 63-64. 2 tables.

Counts of the erythrocytes, leucocytes and polymorphonuclear neutrophiles of the blood of strains of chickens resistant and susceptible to infection with *Salmonella* (formerly *Bact.*) *pullorum*, were carried out 3, 6, 7 and 9 days after hatching. It was found that the number of erythrocytes was greater for the resistant than for the susceptible strain, while the leucocyte count and the percentage of neutrophiles were lower for the resistant than for the susceptible strain. Similar studies were made on blood from chickens inoculated with *S. pullorum*, and it was found that, while there was no change in the red cell and white cell counts,

the percentage of neutrophiles was higher in the inoculated susceptible than in the inoculated resistant chickens.—R. F. GORDON.

SCHAAF, J. (1934). Die infektiöse Enteritis der Enten und ihre Bedeutung für die Nahrungsmittelhygiene. [**Infectious Enteritis of Ducks and its Importance to Public Health**].—*Tierärztl. Rdsch.* **40.** 555-559. [10 refs.]

Food poisoning may result from the consumption of the eggs or flesh of ducks infected with salmonella organisms. The author reviews the disease in ducks and, amongst other interesting points, he mentions that eggs may easily become contaminated on the outside by droppings and that prolonged storage may enable the organisms to penetrate the shell. Duck strains of *Salmonella enteritidis* (formerly *Bact. enteritidis* Gärtner) appear to share with the Moscow type the property of slow fermentation of dulcite. *S.* (formerly *Bact.*) *anatum* has not been met with in natural outbreaks of disease in Germany. Measures to control the disease are impracticable for the open market, and it is advisable either to cook ducks' eggs for eight minutes, or to obtain them from a source where satisfactory methods of disease control are practised.—NORMAN HOLE.

—. (1935). **Report of Committee on Bang's Disease.** [**U.S. Livestock Sanit. Ass.**]—*J. Amer. vet. med. Ass.* **86.** 311-341.

The annual meeting of the Committee on Bang's disease was attended by state representatives to discuss the federal programme for the control of the disease and to draw up a uniform scheme. Individual states have for a number of years been fighting the disease by blood testing and the isolation or disposal of reactors. Extensive field experience has proved that, when properly carried out in its various details, this method is efficacious for the eradication of the disease, but up to the present there has been an absence of uniformity in the regulations enforced by the various states.

Two years ago, on the recommendation of this committee, a uniform technique was adopted by all states for the tube agglutination test.

A new era has now opened for the control of bovine contagious abortion in America, as the Federal Government has initiated a programme, in co-operation with the states, for the blood testing of cattle on a voluntary basis and the slaughter of all reactors.

> " Funds provided by the 73rd Congress in supporting the LaFollette Amendment to the Jones-Connally Bill for the relief of the cattle industry, including the reduction in the cattle population, made it possible for the federal government to start the Bang's disease work in coöperation with the state authorities."

Compensation is apparently being given for the reactors slaughtered.

> " Under the provisions of the federal regulations, the maximum payment for grade cattle is $20.00, and $50.00 for pure-bred registered cattle. The owner receives the net salvage, in addition to indemnity, but in no case does the owner receive more than the appraised value."

The annual loss caused by bovine contagious abortion in America has been estimated at $50,000,000. There is apparently a wide-spread demand by cattle owners for a properly organized campaign against the disease, on similar lines to those for the eradication of tuberculosis.

There is already a " waiting list " which shows that owners have applied for the testing of 900,000 cattle.—T. M. DOYLE.

CALDWELL, Dorothy W., PARKER, N. J., & MEDLAR, E. M. (1934). **Studies on a Herd Infected with Brucella abortus. I. A Study of the Effects of Vaccina-**

tion and of Segregation on the Control of Brucella abortus Infection.—*J. Amer. vet. med. Ass.* **84.** 75-90. 3 tables, 2 charts. [29 refs.]

An account is given of attempts to control bovine contagious abortion in a dairy herd. The authors claim that the use of living abortion vaccine for a period of four years resulted in reduction in the abortion rate from 26·2 per cent. to 3·4 per cent., but that its use was followed by an increase in the number of cases of retained placenta. Vaccination stimulated the production of blood agglutinins and, while the agglutination titre in vaccinated animals tended to decrease, agglutinins were demonstrable as long as they were under observation. Monthly observations failed to show any correlation between the time of year, breeding period, calving period or milk production period and an increase or decrease in the agglutination titre. When the use of living vaccine was discontinued and before segregation was carried out, a high abortion rate was experienced among purchased cattle and unvaccinated cattle bred on the farm. Eradication was attempted by the sale of cattle which had a high agglutination titre and the segregation of those with a low agglutination titre. When this policy was adopted, 86 per cent. of the cattle tested reacted to the agglutination test, but this number fell to 4 per cent. when periodic testing and segregation had been carried out for four years. The herd was maintained during this period by cattle bred on the farm.—F. Blakemore.

Castelli, A. (1934). La fréquence de la brucellose chez les animaux d'abattoir dans la province de Cagliari. **[Incidence of Brucellosis in Cattle in Cagliari].** —*Boll. Sez. ital. Soc. int. Microbiol.* **6.** 456-458. [In French].

Cases of undulant fever in man have been on the increase in Sardinia during the past 14 years, especially in the province of Cagliari. A correlation has been noticed by other authors between outbreaks of undulant fever in man and of abortion in ewes and goats. The author, however, has also observed cases of undulant fever in areas where no abortion was occurring in ewes and goats, or even where such animals were not reared. In tests of the blood of cattle slaughtered for food in Cagliari against four strains of brucella, positive agglutinations were obtained in 76·3 per cent. of 127 adult cattle and 60·8 per cent. of 46 calves tested. —A. Brownlee.

Haring, C. M. (1933). **The Control of Bang's Disease on the Pacific Slope of North America.**—*Proc. 5th Pacif. sci. Congr. Victoria & Vancouver.* pp. 3013-3022. 3 tables. [31 refs.]

Haring outlines briefly the methods practised for the control of bovine contagious abortion in some of the western states of America.

He states that evidence regarding the worthlessness of dead abortion vaccine has accumulated during recent years to such an extent that the Chief of the Bureau of Animal Industry has issued a notice, from which the following is an excerpt :–

" Since killed cultures of *Br. abortus* are conceded by recognized workers on abortion disease to be of no practical value in preventing and controlling this disease, I request that all licences for abortion bacterins (except equine) be forwarded to the Bureau promptly for termination."—T.M. Doyle.

—. (1934). **Control of Bovine Contagious Abortion.**—*Sovyet. Vet.* No. 11. pp. 82-86. [Abst. from French summary].

The disease is defined and instruction in prophylaxis for clean herds detailed. The latter includes isolation and agglutination testing of purchases, bacteriological examination of aborted calves and various tests of aborting cows. Measures to be taken once the disease is diagnosed are next detailed : these are isolation of

diseased animals, disinfection of their surroundings, destruction of dung, etc. In a " sovkhoze " [state farm] the diseased groups are isolated in special quarters, and in a " kolkhoze " [collective farm] they are placed upon isolated plots.

Young healthy animals should be reared apart from adults, and special measures for this are cited ; general feeding and attendance are also considered. Details are given for the application of the abortin test.—C. V. WATKINS.

THOMSEN, A. (1934). **Brucella Infection in Swine. Studies from an Epizootic in Denmark 1929-1932.**—*Acta path. microbiol. scand.* Suppl. 21. pp. 253. 31 figs. on 15 plates, 20 tables. [11 pp. refs.] [Orig. in English : French and Danish summaries].

This monograph on brucella infection of swine is divided into an introduction and 12 chapters. The introduction consists of a general survey of some of the principal facts in connection with brucellosis in animals and man. The remainder of the volume deals with the author's observations on abortion in swine with references to relevant published work on the disease.

A severe but localized epizootic of brucellosis in swine, involving about 240 farms, occurred in Denmark between the years 1929 and 1932, when it was finally eradicated. Eradication was achieved by the slaughter of infected animals or herds. In some cases the Government paid full or partial compensation for the animals. By a special act passed in February 1932, rescinded in October of the same year, compulsory notification of the disease was introduced. Thomsen discusses the possible origin of the infection without, however, being able to solve the question. It was from this epizootic that he obtained the material for his investigations.

In infected herds 39 per cent. of boars gave positive reactions to serological tests. Bacteriological examinations were made of the genital organs of 19 infected boars and from 11 of these the porcine type of *Br. abortus* was isolated ; from the vesiculae seminales seven times, from the epididymes five times, from the testes twice and from Cowper's glands once.

The author describes a condition in infected sows which he calls " miliary brucellosis of the uterus ". The lesions consist of numerous well-defined whitish-yellow nodules, varying in size from a pin-head to a pea, deeply set in the mucous membrane and protruding above its surface. The condition was observed in 47 per cent. of reacting sows and gilts.

Examination failed to demonstrate the porcine type of *Br. abortus* in the milk of seven reacting sows, but it was isolated from a supramammary lymphatic gland of one of them. The organism was demonstrated once only from the urine of 28 animals tested, 4 boars and 24 sows.

In nine boars, artificially infected *per os*, it was isolated from the urine of two of them, three and 12 months after the infective dose.

It was shown in two instances that naturally infected boars can transmit the infection at coitus. The intradermal test gave encouraging results and Thomsen considers it a useful supplementary method. No evidence was obtained during the epizootic to show of any transference of the infection from pigs to cattle.

An enquiry into the health of persons working on 237 of the infected farms revealed that only two cases of undulant fever had occurred during the period of the outbreak.—T. M. DOYLE.

CHRISTIANSEN, M. J., & THOMSEN, A. (1934). Histologische Untersuchungen über Brucella suis-infektion bei Schweinen. [**Histological Research on** *Br. abortus* (**Porcine Type**) **Infection in Pigs**].—*Acta path. microbiol. scand.* Suppl. 18. pp. 64-85. 15 figs. on 9 plates. [4 refs.]

The author gives a detailed account of the *post-mortem* examination of the uteri of 49 sows whose blood contained specific agglutinins for the porcine type of *Br. abortus.* Of these, 23 were affected in varying degrees with miliary brucellosis [see also Thomsen–above]. A pathological condition due to the same organism was found in the genital organs of seven boars. In general, the histopathology of the lesions in the uterus of the sow and in the testicles, epididymis and seminal vesicles of the boar was of the same character, consisting of an increase of the connective tissue with cellular infiltration and uniform changes in the glandular tissues. The secretory tubules were sometimes atrophied or, as was often found in the uterus, a cystic condition developed. Proliferation of the epithelial cells lining the ducts was followed by necrosis. The author is of the opinion that the boar may still be potent during the initial stages of the disease, but that he is at the same time capable of infecting sows directly.—S. J. Edwards.

Feldman, W. H., & Olson, C., Jr. (1935). **Effects of Certain Environmental Influences on the Longevity of Brucella abortus, suis.**—*J. Amer. vet. med. Ass.* **86.** 153-161. 3 tables. [6 refs.]

Lack of data on the biological characters of the porcine strain of *Br. abortus* prompted the authors to write this report. Information is provided on the ability of the organism to withstand adverse environmental conditions. The origin, characters and pathogenicity of the strain used in the experiments are described. Three groups of experiments are recorded. It was found that the organism was more resistant to low temperatures under external and refrigerator conditions than to room temperature. Four days' exposure to direct sunlight in soils of various compositions appeared to be effective in reducing viability and pathogenicity.—A. L. Mullen.

Pagnini, U. (1934). Recherches sur la dissociation des germes du type Brucella. [**Dissociation of the Brucella Group**].—*Boll. Sez. ital. Soc. int. Microbiol.* **6.** 206-210. [12 refs.] [In French].

The author studied dissociation in the brucella group. He found that serial cultivation of recently isolated strains in glucose-glycerin broth brought about marked and persistent dissociation after a period of some months.

The simple ageing of broth cultures was valueless as a method of dissociation ; ageing in deep broth cultures was slightly more effective.

The appearance of rough strains did not cause any appreciable difference in the production of H_2S. Rough forms sometimes appeared to be slightly more resistant than smooth forms to the inhibitory action of dyes.—T. M. Doyle.

Pagnini, U. (1934). Studi sulla differenziazione della Brucelle. [**Differentiation of the Brucella Group**].—*Boll. Ist. sieroter. Milano.* **13.** 145-180. 5 tables. [97 refs.] [English summary : abst. from abst. in *Bull. Hyg. Lond.* **9.** 645].

The author studied 47 bovine *abortus*, three porcine *abortus*, 33 *melitensis* and seven *paramelitensis* strains obtained from Italian territories or from England. Several differentiating methods were used (dye tests, H_2S production, special agglutination tests, Millon's reagent), the chief importance being laid on the production of H_2S by cultures and the behaviour of cultures in media containing dyes. It is thus possible to differentiate bovine *abortus*, porcine *abortus* and *melitensis* strains.

These results agree with those of other workers.—J. E.

GWATKIN, R. (1935). **A Study of Various Fractions of *Brucella abortus*. I. Preparation, Toxicity and Biochemical Nature of Alcoholic Precipitate. II. Complement Fixation and Intradermal Tests with Alcoholic Precipitate. III. Immunity Experiments with Alcoholic Precipitate. IV. Residues from Whole Filtrate and after Removal of Alcoholic Precipitate. V. Alcoholic Precipitates Prepared from a Dissociated Strain of *Br. abortus* and from *E. coli* and *B. subtilis*. VI. Extract of Dried and Ground Organisms.**—*Canad. J. Res.* **12.** 115-124, 125-132, 133-145, 147-155, 156-160 and 161-164. 44 tables, 3 charts. [28 refs.]

Gwatkin has studied the toxic, antigenic and protective properties of certain fractions of *Br. abortus*. Alcoholic precipitates were prepared by a method similar to that of Przesmycki from shaken and filtered suspensions of *Br. abortus*, the growth from 625 square inches of liver agar surface producing about 1 g. of precipitate. Intraperitoneal injection of guinea pigs with small amounts of these produced peritonitis and severe illness or death, accompanied by a marked drop in temperature, frequently to 93°F. within a few hours. The toxic fraction was water-soluble. Dialysis reduced its toxicity in one experiment out of two. Filtration of the suspension through a Mandler filter did not modify its effects. The preparation of the precipitate gave rise to symptoms simulating undulant fever in a hypersentitive human subject, which moreover appeared to desensitize him for several weeks. The precipitate consisted almost entirely of carbohydrates. The use of varying volumes of alcohol did not affect the toxic or antigenic qualities of the precipitates.

The alcoholic precipitates already described showed high antigenic properties in the complement-fixation test ; this was not lowered by dialysis or filtration. Intradermal injection of " suspensions " of the alcoholic precipitate also caused reactions in infected guinea pigs in dilutions which produced no reaction in normal guinea pigs. Filtration did not modify these results and with two out of three samples they were not affected by dialysis (membranes unstandardized but permeable to NaCl). The addition of 0·25 per cent. formalin did not modify the skin reactions.

Brucella antiserum protected guinea pigs against the intraperitoneal injection referred to in the first paragraph but previous absorption of the serum with *Br. abortus* reduced this protective power. Normal serum was not protective. As judged by agglutination and complement-fixation tests, the alcoholic precipitates were as efficient as whole culture in removing antibodies *in vitro*. The intraperitoneal injection of small amounts of alcoholic precipitate in guinea pigs and a rabbit stimulated agglutinin production and opsono-cytophagic activity, but did not protect guinea pigs against infection with *Br. abortus via* the conjunctiva or prevent abortions in infected animals. Oral administration of precipitate did not give rise to symptoms in guinea pigs.

Residues obtained by evaporating a filtered suspension of *Br. abortus* after removal of the alcoholic precipitate or by evaporating whole filtrate were less toxic for guinea pigs than alcoholic precipitate. The former had only weak complement-fixing power and produced only weak reactions when injected intradermally. Residue from whole filtrate from five-day cultures was as active as alcoholic precipitate in complement-fixation, but that from two and three-day cultures was weaker. Injections of these substances intraperitoneally failed to protect guinea pigs against infection *via* the conjunctiva. A precipitate prepared with ammonium sulphate appeared similar to alcoholic precipitate as far as it was studied in tests for complement-fixing power and for toxicity.

An alcoholic precipitate prepared from an R strain of *Br. abortus* resembled those obtained from the S strain, but its toxicity and power of producing skin

reaction was less, whilst it did not fix complement. An alcoholic precipitate prepared from *Bact. coli* produced symptoms similar to but more pronounced than any produced with *Br. abortus*. They were modified by the corresponding antiserum but not by *Br. abortus* antiserum. An alcoholic precipitate of *B. subtilis* produced only a slight fall of temperature.

Filtrates from dried and ground *Br. abortus* had properties similar to those of alcoholic precipitates but their toxicity and complement-fixing power were less. They produced skin reaction. Intraperitoneal injection failed to protect against infection. The preparation of this material was also accompanied by symptoms of undulant fever in a hypersensitive human subject.—A. W. STABLEFORTH.

PAGNINI, U. (1934). Ricerche sui brodo-filtrati alla Besredka anti br. abortus ed anti br. melitensis. [**Experiments with** *Brucella abortus* **and** *Br. melitensis* **Antivirus**].—*Nuovo Ercol.* **39.** 181-190. [18 refs.]

In order to study the production of antivirus by *Br. abortus* and *Br. melitensis*, 48-hour agar cultures of these organisms were inoculated into meat broth and samples of the filtrates were tested at monthly intervals. A Berkefeld N candle was used and complete saturation with antivirus was considered to have occurred when 6 to 8 c.c. of the filtrate prevented the growth of a loopful of the homologous strain. It was found that young cultures are distinctly inferior in the production of antivirus to old cultures and that at least three months are required before it is produced in any quantity. In fact, the amount present in a filtrate appears to be in direct proportion to the length of time of cultivation. Heating the filtrates at 120°C. for 20 minutes did not destroy their inhibitory effect. Contrary to the findings of earlier workers, the filtrates were not found to have bactericidal properties. Bacilli which had been treated with filtrate, however, were incapable of producing a high agglutination titre. On prolonged cultivation, the pH concentration of the media always increased. The author considers that, although *Br. melitensis* is a less active producer of antivirus than *Br. abortus*, the examination of broth filtrates in which they have grown is of no practical value as a means of distinguishing these organisms.—J. A. NICHOLSON.

MEYER, K. F., & EDDIE, B. (1935). **The Problem of Caprine Brucella Infections in the United States.**—*J. Amer. vet. med. Ass.* **86.** 286-303. 2 tables. [66 refs.]

Since 1930, 2,500 goats have been examined by the rapid agglutination test, showing a 1 to 4·8 per cent. infection of herds with *Br. melitensis* " provided this test is dependable when applied to emaciated animals." Nine strains of the organism were isolated, and detailed study of them shows that goat disease in the south-west of the United States is due to typical goat strains. Natural abortion due to the disease could not be determined from field cases, but oral, conjunctival and subcutaneous inoculation caused abortion (four out of seven trials) 17 to 30 days after administration to goats. A milk-whey agglutination reaction of 1 : 320 or more indicated udder infection.

Cows affected with goat strains were found to be very dangerous as a source of human infection, while sheep, although implicated in France, were not proved dangerous in the United States.

Caprine brucellosis was not self-limiting, although several experiments seemed to prove this. Conversely, latent infection in naturally and artificially infected animals was found. Recovery seems due to pronounced phagocytic activity, plus local and general allergy.

Injection of bovine and porcine strains in goats was followed by complete recovery.

Various diagnostic tests are discussed. " Public Health Authorities should demand that goat milk dairies consist of animals negative to skin, blood and whey tests ".

Vaccination is not recommended. Host susceptibility (never 100 per cent.) seems more important than the virulence of the bacterium in producing human disease.—C. V. WATKINS.

ROSSI, P. (1935). La fièvre ondulante à base de Brucella abortus en Saône-et-Loire. [*Br. abortus* **Infection of Man in Saône-et-Loire, France**].—*Rev. Path. comp.* **35.** 584-596. 1 fig. [1 ref.]

Undulant fever, caused by *Br. abortus*, was first recorded in 1932 in Saône-et-Loire, since when 27 suspected cases have been reported. Four of these cases were confirmed by isolation of the organism by blood culture. Rossi is of the opinion that a more intensive enquiry in this area will demonstrate that *Br. abortus* infection of man is more common than is at present believed.

He describes in detail the clinical syndrome of the disease in the four men from whom *Br. abortus* was isolated.

Rossi states that authentic cases of *Br. abortus* infection of man are steadily increasing in France and that the pathogenicity of *Br. abortus* for man is for some unknown reason becoming exalted.—T. M. DOYLE.

LEARMONTH, R., & HALL, I. C. (1934). **An Unsuccessful Effort to Incriminate Dairy Goats in the Transmission of Undulant Fever in Colorado.**—*J. Amer. vet. med. Ass.* **84.** 915-917. [17 refs.]

Knowing that undulant fever existed in Texas and Arizona, the authors decided to test some of the numerous goats. Owing to great opposition, they were only able to test 198 goats – blood from 70, but milk from 128.

They describe their technique, using two cultures of *Brucella melitensis*. No positive result was obtained and only one doubtful result, which could not be repeated. There was no evidence that the goats in those districts harboured *Br. melitensis*. The tests confirm the belief that milk sera are less satisfactory for the agglutination test than blood sera.—D. S. RABAGLIATI.

MARCIS, A. (1934). Ujabb adatok a juhok fertozo elvetéleséhez. [**Contagious Abortion of Sheep**].—*Allatorv. Lapok.* **57.** 313-315. [Abst. from abst. in *Rev. gén. Méd. vét.* **44.** 149].

The author describes a *Vibrio foetus* infection causing abortion in ewes in Hungary. It did not occur in well-kept and well-fed sheep and prevention was therefore fairly simple.—J. E.

STOILOWA, Eugenia R. (1935). Beitrag zur Differenzierung des Rauschbrandes und Pararauschbrandes durch den Hämolyseversuch im Reagenzglas. [**Differentiation of** *Clostridium chauvoei* **and** *Cl. septique* **by a Haemolytic Test**].—*Münch. tierärztl. Wschr.* **86.** 97-99. 1 table. [14 refs.]

The author describes a haemolysis test for differentiating *Cl. chauvoei* and *Cl. septique*. A mixture is made of 0·1 c.c. of a 48-hour-old liver broth culture of the organism with 0·2 c.c. of saline and 0·2 c.c. of a 3 per cent. suspension of washed red blood corpuscles of a sheep. *Cl. chauvoei* produces haemolysis at room temperature within one hour, whilst *Cl. septique* produces no haemolysis.—E. J. PULLINGER.

DÉBONÉRA, G. (1934). Le charbon symptomatique en Grèce et les résultats de la vaccination par la méthode Leclainche et Vallée. [**Blackleg in Greece : Vaccination Results**].—*Rev. gén. Méd. vét.* **43.** 268-270.

A short account is given of the epidemiology of blackleg in Greece. The author made observations in affected districts on about 10,000 cattle vaccinated with formolized cultures of *Clostridium chauvoei*. In the majority of herds vaccination was practised only after the occurrence of cases of blackleg and in such cases the losses ceased a week after vaccination. The author concludes that vaccination by this method is of great value in the control of the disease.—F. BLAKEMORE.

BERGE, E., & MEYN, A. (1934). Beitrag zu den Gasödemen beim Pferde. [**Gas Oedema in the Horse**].—*Arch. wiss. prakt. Tierheilk.* **68.** 305-321. 1 fig., 2 graphs. [9 refs.]

The authors made a study of two sporadic cases of gas gangrene of the horse due to infection with *Clostridium septique*, and one case due to infection with *Cl. welchii*. Cultures of *Cl. chauvoei*, *Cl. welchii*, *Cl. septique*, *Cl. oedematiens* and *Cl. histolyticum* were inoculated subcutaneously and intramuscularly into horses. It was found that *Cl. chauvoei* was non-pathogenic ; *Cl. welchii* produced only a slight transient local gas oedema but, in the case of the other three types, a severe gas oedema resulted which ended in the death of the experimental horses. The clinical observations on all experimental horses are noted, and mention is made of the blood-stained serous oedema which distinguishes *Cl. septique* infection from the blood-stained gelatinous oedema of *Cl. oedematiens* infection. *Cl. histolyticum* infection occurs rarely in nature ; experimentally, the distinguishing feature is myolysis, with the formation of a chocolate-coloured, foul-smelling fluid.

For the prevention of gas gangrene in the horse, antisera should contain fractions for the pathogenic strains, especially for *Cl. septique*.—D. R. WILSON.

MONTGOMERIE, R. F., & ROWLANDS, W. T. (1934). **Lamb Dysentery in North Wales.**—*Vet. J.* **90.** 323-337. 4 tables. [14 refs.]

The authors give a review of the early work on lamb dysentery. In view of the occasional failure of serum to protect lambs against dysentery in the field in 1933, they continued their studies to determine the nature of the disease or the toxic element responsible. Previous investigators had noted that the tissues of lambs slaughtered while suffering from lamb dysentery were seldom invaded by the bacillus, but that the bowel contents were rich in this organism even when there was no evidence of ulceration. Filtrates prepared from intestinal contents of typical and atypical cases were examined during the seasons 1931, 1932 and 1933 and, in 1933, 56 cultures of the bacillus were isolated from eight cases for further study. It was concluded that the lamb dysentery bacillus produces a toxin which contains two toxic fractions ; the first, produced early in incubation in high concentration, deteriorated rapidly and was neutralized by *Clostridium* (formerly *Bacillus*) *paludis* [Wilsdon type C] antitoxin ; the second, produced in low concentration during the early period of growth, increased as incubation was prolonged, was more stable and was neutralized by *Cl. ovitoxicum* (formerly *Bacillus ovitoxicus*) [Wilsdon type D] antitoxin.

The failure in 1933 of the serum to protect in all instances appeared to be due to the fact that the culture used to produce the toxin, necessary for the immunization of horses, had become unable to produce the toxic fraction of the *Cl. ovitoxicum* type during any period of its growth.

In the case of the toxic bowel filtrates it was found that, when examined, the toxin consisted of one fraction only ; with the exception of one, all of the 1933 filtrates contained *Cl. ovitoxicum* fraction, being neutralized only by *Cl. ovitoxicum* antitoxin or lamb dysentery serum which contained antitoxin for this fraction. *Cl. paludis* antitoxin had no neutralizing value. The toxic fraction in the odd case

consisted of the *Cl. paludis* type and was neutralized only by *Cl. paludis* antitoxin or lamb dysentery serum consisting of, or containing, this type antitoxin.

As a result of this work, the authors state that *Cl. welchii* [Wilsdon type B] alone is the cause of lamb dysentery, but that this type, as mentioned above, can produce two fractions of toxin – the *Cl. paludis* type in early incubation and the *Cl. ovitoxicum* type in later incubation. It is, therefore, necessary that all sera designed to prevent lamb dysentery should contain antitoxins of both types.
—D. R. Wilson.

Leslie, A. (1935). **The Relation Between Faulty Winter Feeding of Ewes and the Susceptibility of Their Lambs to Pulpy Kidney. (Entero-Toxaemia).** —*Rep. 3. Canterbury agric. Coll.* pp. 17. [3 refs.] [Mimeographed].

The author has under observation a flock of 900 ewes which are weighed regularly, and of which the dates of service and of lambing are known. Weights of lambs at birth and their gain for several weeks, along with tailing and castrating dates, are all observed. The flock is divided so that antenatal nutritive conditions differ, the one on a high and the other on a low plane. Under these conditions, very useful information on *ante-partum* paralysis in the ewe combined with arthritis (so-called) and entero-toxaemia in lambs can be and has been gained.

The report deals in detail with eight cases of pulpy kidney disease, all except one appearing in lambs from the poorly fed ewes. The ewes of this group were placed on a green, milk-stimulating pasture as soon as they lambed. It is Leslie's contention that the milk flow became too great in these cases for the poorly developed young lambs which, although born alive, were underdeveloped at birth and that consequently digestive disturbances arose which in many cases were accentuated by pica and precipitated pulpy kidney disease from *Clostridium ovitoxicum* (formerly *B. ovitoxicus*) intoxication. Leslie mentions 13 precipitant conditions which might bring about pulpy kidney disease in lambs.

When ewes are fed on sufficient protein and vitamin during gestation, the lambs are stronger and more vigorous at birth and able to digest greater quantities of milk.

Management of the flock of lambs becomes difficult with regard to the control of pulpy kidney disease unless the whole history of winter feeding of the ewe and the precipitant leading up to pulpy kidney disease in the lamb be recognized.

The report is recommended to those interested in pulpy kidney disease and the growth rate of lambs after birth.—C. S. M. Hopkirk.

Gordon, W. S. (1934). **Entero-Toxaemia in Herbivorous Animals – its Possible Bearing on Grass Sickness in Horses.**—*Vet. Rec.* **14.** 1016-1036. 12 tables. [15 refs.]

A number of cases are described in which filtrates prepared from intestinal contents of lambs, sheep and horses contained toxins of the *Cl. welchii* group. The presence of these toxins was established by the intravenous inoculation of mice and their identity was determined by suitable neutralization tests with *Cl. welchii* antitoxins, types " A ", " C " and " D " respectively. In outbreaks of sudden death in sheep and lambs, the intestinal contents were usually toxic. It was found that " A " and " C " antitoxin invariably failed to afford protection in mice, but a mixture of " C " and " D " always neutralized the toxin, while " D " antitoxin was usually efficient. It is considered that this evidence, in conjunction with the clinical and *post-mortem* findings, points to the existence in Scotland of a disease similar to entero-toxaemia occurring in Western Australia and described by Bennetts [this *Bull.* **3.** 530 and **4.** 213].

In horses affected with grass sickness an examination of intestinal contents was undertaken mainly on account of the failure to obtain any pathogenic agent in the lymphatic glands or organs. A series of intestinal filtrates was obtained from typical acute fatal cases and in several a toxin lethal for mice was found. Neutralization experiments with various *welchii* antitoxins and those of other anaerobic organisms indicated that only *Cl. welchii* type " D " or a mixture of " C " and " D " were capable of affording complete protection. Filtrates from 29 horses yielded a toxic element in 11 cases.

Many attempts were made to isolate *Cl. welchii*, type " D ", but with one exception in which it was recovered, only type " A " could be detected. A toxic intestinal filtrate from one case was inoculated intravenously into a horse and produced profuse sweating, salivation and other symptoms suggestive of grass sickness, while a second horse which received a preliminary dose of type " D " antitoxin remained unaffected.

An attempt was also made to set up grass sickness-like symptoms by the oral administration of cultures of type " D " to normal horses. One animal in which bowel stasis had been induced by a mixture of opium and belladonna, received 24 litres of an alkaline culture : it died ten hours later. Two animals receiving, in the one case, culture plus alkali, and in the other a similar mixture plus opium, were visibly affected, but recovered. When tested subsequently with " D " toxin intravenously they failed to react, whereas a normal horse collapsed and died 24 hours later.—R. E. Glover.

Bull, L. B. (1935). **" Swelled Head " or " Big Head " in Rams due to Localised Infection by *Clostridium oedematiens*. Serous, Non-Gaseous, Malignant Oedema of the Head of Rams.**—*J. comp. Path.* **48.** 21-35. 2 tables. [21 refs.]

The terms " swelled head " and " big head " have been applied to various conditions in sheep. These conditions can be divided into two groups :– (1) those due to photosensitization and affecting sheep generally, and (2) the type described in this article, due to infection and affecting only rams.

The disease mostly affects young rams in the summer and, to a greater extent, in the autumn. The usual incidence varies from only sporadic cases up to 4 per cent. of the young rams. Certain districts are more affected than others. Swelling of the head and often along the neck sometimes as far as the brisket occurs. Once oedema has become definitely established death invariably follows, usually within 48 hours, from toxaemia and partly from interference with respiration. Careful examination of the forehead reveals the presence of one or more small wounds which show little or no inflammatory reaction apart from the oedema. The oedematous fluid is straw coloured. *Cl. oedematiens* is found in pure culture, or with other organisms, in the wound, and in pure culture in the cutis or subcutis, about 1 cm. from the wound. No bacteria were found in the tissue 2 cm. or more from the wound, or in any of the organs. Cultures should be made from each wound. The morphological and cultural characters of the causal organism are described.

The disease was reproduced experimentally by inoculation of pure cultures of *Cl. oedematiens*. The metatarsal region was not found to be so susceptible to infection as the forehead. The disease could be reproduced experimentally in ewes as well as rams, indicating that it is infection of wounds inflicted during fighting which determines the higher incidence in rams.

A vaccine was prepared by growing the organism in hormone broth containing 0·2 per cent. glucose for 24 hours, separating the bacilli by centrifuging, detoxifying the toxin with 0·2 per cent. formalin at 25°C. and adding the bacilli after treating

them with 0·5 per cent. formalin. Of 78 male lambs inoculated three times with this vaccine, none died, whereas 6 per cent. of unvaccinated animals died.

This disease may be differentiated clinically from that due to photosensitization by the greater oedema of the ears, the more frequent recoveries and the development of the characteristic necrotic areas shown in the latter disease.—A. BROWNLEE.

KALMBACH, E. R., & GUNDERSON, M. F. (1934). **Western Duck Sickness: A Form of Botulism.**—*Tech. Bull. U.S. Dep. Agric.* No. 411. pp. 81. 2 tables, 13 photographs on 6 plates, 1 map. [73 refs.]

This is a very serious disease of wild duck and other migratory water-fowl in the western states of North America. It has been known to exist for some time and at irregular intervals causes an enormous mortality; 1910, 1921, 1929, and 1932 were all seasons of very heavy losses, some idea of which is obtained from the records of the 1932 outbreak, when, along the shores of a lake in Utah, there were 8,000 to 10,000 dead ducks per mile.

The disease was originally thought to be due to the toxic action of certain soluble salts found in alkali soil; pollution of water with industrial waste, lead poisoning, gases such as methane and hydrogen sulphide, and toxic algae are other aetiological factors which have received attention. This report shows that the disease is really due to the toxin of *Clostridium botulinum* type C since this organism, a saprophyte of wide distribution, is not itself pathogenic, but its toxin causes the disease when ingested. Many infected birds must have been used for human consumption; it does not, therefore, seem possible that it is pathogenic for man.

Clinically the disease is a muscular weakness resulting from the action of the toxin on the nervous system. Varying degrees of intoxication are recorded, dependent probably upon the amount of toxin ingested, from partial paralysis to complete prostration. The temperature is usually subnormal, and the disease is either rapidly fatal, or recovery sets in about the third day. Chronic cases do occur, however, from which recovery is never complete. The value of observation of the lesions for purposes of diagnosis is chiefly negative, but a stoppage of the vent with distention of the cloaca is frequent.

The disease has been reproduced experimentally by feeding the incubated body tissues of birds dead of the disease, by the injection of normal saline extracts of such tissues, by feeding or injecting culture media inoculated with material from duck-sickness sources and by cultures of a known type of *Cl. botulinum*. The organism has been recovered from birds dead of the disease and from the mud of duck-sickness areas, especially when this contained much organic matter, and the toxin itself has been demonstrated free in the field, in the bodies of dead birds, in water, in the larvae of flies, in mud, etc., by the direct inoculation of pigeons, toxin-antitoxin tests also being used to demonstrate the type C toxin. For toxin elaboration in the field the presence of organic material is necessary, and the alkalinity of the water in the affected districts favours production of the toxin. Temperature and water levels are other most important factors in the epidemiology of the disease.

The treatment of wild birds is not of practical value, but the rescue and care of affected birds and frightening them away from infected areas are to a certain extent remedial measures. The disease is definitely associated with shallow waters and mud flats, and either the drying of such areas, or, better, the flooding of them, is a more effective method of preventing the disease.—NORMAN HOLE.

PULLAR, E. M. (1934). **Enzootic Botulism amongst Wild Birds.**—*Aust. vet. J.* **10.** 128-135. 3 figs. [11 refs.]

During the summer of 1931 to 1932, a disease affecting wild aquatic birds occurred in swamps in several parts of Victoria, and resembled botulism of wild ducks (" western duck sickness ") of America. The disease was mainly confined to a portion of the Hume Reservoir where, owing to the prevailing wind and other factors, dead vegetation had accumulated, forming a mud bank of slime. Dead animals also collected in this slime and, during the hot summer weather, it formed a suitable culture medium for *Clostridium botulinum*. The disease disappeared when the weather became cooler.

The affected birds showed a progressive paralysis affecting the legs, the wings and, later, the cervical muscles. Late in the disease the corneal nictitating membrane reflex became sluggish and disappeared. Diarrhoea was usually present. Few pathological changes were seen at autopsy. Culture made from organs of affected birds produced a toxin which was lethal for a 250 g. guinea pig in a dose of 0·0005 c.c. Toxin-antitoxin neutralization tests with this showed the organism to be *Cl. parabotulinum*. Samples of slime and adjacent water also proved toxic to guinea pigs, and a sterile filtrate of the mud was lethal to a 250 g. guinea pig in a dose of 0·01 c.c.—W. I. B. Beveridge.

I. Albiston, H. E., & Pullar, E. M. (1934). **A Short Note on Actinomycotic Granulomata.**—*Aust. vet. J.* **10.** 146-147. 1 table. [6 refs.]

II. Fethers, G. (1934). **Streptotrichosis (Pseudo-Actinomycosis) in a Dog.**—*Ibid.* 151-152. [4 refs.]

I. An examination was made of 200 lesions clinically described as " actinomycosis ". Of 153 cases of mammary " actinomycosis " described by various authors (117 of which were recorded by the present writers), all but two have been due to staphylococci. Of these two, one was due to an unidentified streptothrix and the mammary lesion was an extension of a skin lesion, and the other was due to actinobacillus.

II. A case of streptothrichosis in an 18-month-old dog is described clinically. The animal eventually died and an autopsy revealed extensive peritonitis with much pus containing granules in which was demonstrated a Gram-positive streptothrix with occasional club-shaped terminals.—W. I. B. Beveridge.

Mathieson, D. R., Harrison, Ruth, Hammond, Carolyn, & Henrici, A. T. (1935). **Allergic Reactions of Actinomycetes.**—*Amer. J. Hyg.* **21.** 405-421. 6 tables. [9 refs.]

The following are the authors' chief findings as a result of their investigations into the part played by allergic phenomena in actinomycetes infections.

Experiments with *Actinomyces gypsoides* and *A. asteroides*, although not conclusive, tend to show that allergic sensitization occurs in rabbits and guinea pigs following experimental infection and vaccination. In the case of *A. bovis* the reactions were more marked with healthy than with affected patients. Saprophytic aerobic actinomycetes failed to induce any sensitivity in rabbits. Nothing akin to the Shwartzman phenomenon could be demonstrated.

Regarding the relationship of sensitization to infection, the authors' experiments " strongly suggest that actinomycosis in man and animals does not result from a single invasion of the parasites, but that repeated exposure leading to sensitization is a factor in the etiology."—Gwilym O. Davies.

Schellner. (1935). Ueber eine beim Pferde durch Hefezellen verursachte Geschwulst in der Nasenhöhle und deren Nebenhöhlen. [**Nasal Tumours in the Horse Caused by Yeast Cells (Blastomycetes)**].—*Z. Veterinärk.* **47.** 111-116. 4 figs. [10 refs.]

In the nasal, frontal and maxillary sinuses of a horse were found large granulomatous swellings in which numerous yeast cells were situated. The swellings consisted largely of connective tissue elements and sarcoma-like cells. The causal organism, a yeast having the character of a blastomycete, could be seen scattered throughout the lesion. The yeast cells also escaped from the granuloma and were to be found in the nasal secretion. By the inoculation of the organism into guinea pigs it proved possible to produce lesions resembling, in a general way, those found in the horse.—E. J. PULLINGER.

DISEASES CAUSED BY PROTOZOAN PARASITES.

PAVLOFF, P. (1934). Recherches sur la présence de kystes à quatre noyaux d'amibes dysentériques dans les selles des porcelets. (Note préliminaire). [**Four-Nucleated Cysts of the Dysentery Amoeba in the Faeces of Young Pigs**].—*Ann. Parasit. hum. comp.* **12.** 394-395. [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 193. Signed C. M. W.]

The paper records merely a negative result, namely the failure to discover four-nucleated cysts of the type of those of the dysentery amoeba in young pigs in France after more than 500 examinations. The examination was undertaken in view of KESSEL's statement that in China 30 per cent. of young pigs examined by him revealed such cysts.

FAUST, E. C., & KAGY, E. S. (1934). **Studies on the Pathology of Amebic Enteritis in Dogs.**—*Amer. J. trop. Med.* **14.** 221-233. 1 fig. [14 refs.]

A histopathological study was undertaken of 94 dogs, which had been infected naturally or experimentally with canine or human strains of *Entamoeba histolytica.* The earliest lesion, which occurs within 24 hours of the intracaecal inoculation of trophozoites, or of the excystment of trophozoites from ingested cysts, is a catarrhal inflammation of the caecum with superficial lysis or necrosis of the mucosa, usually along the surface of the interglandular areas. At this stage there is no leucocytic infiltration, and little bacterial invasion. By introducing an inoculation tube into the caecum, *per rectum, intra vitam,* and gently aspirating along the wall of the organ, mucous material containing amoebae and cell debris is obtained [FAUST. (1930). *P. R. J. Publ. Hlth.* **6.** 391]. In at least one animal, material collected in this way was the only evidence of tissue attack obtained, since the faeces never showed amoebae, and *post-mortem* evidence was negative.

Following this early stage of parasite-host tissue contact, the amoebae work their way down to the basement membrane of the mucosa, effect an entry into the lamina propria mucosae, and sometimes break through into the glands. The muscularis mucosae may form an obstacle to further penetration, and a condition of superficial necrosis follows, such as is commonly seen in cats. In about 70 per cent. of dogs the organisms penetrate the muscularis mucosae, and colonize the vascular tissue of the submucosa, producing a pocketed excavation which usually communicates with the lumen of the bowel through the opening in the muscularis mucosae. As the process extends, there is a slow necrosis of overlying coats, with an entrance of secondary invaders and an infiltration of polymorphonuclear leucocytes and monocytes. The enlargement of the intestinal lymphatic glands appears to be a reaction to the secondary bacterial invasion. A repair process characterized by epithelial proliferation was never encountered in untreated dogs. The original lesion rarely develops outside the caecum but, at a later stage of the disease, the commonest lesions are those of the rectum ; these latter are also the most conspicuous.—U. F. RICHARDSON.

DESCHIENS, R. (1935). Modification de l'aptitude pathogène, pour le chat, de l'amibe dysentérique en culture. [**Cultural Modification of the Pathogenicity of** *Entamoeba dysenteriae* **for the Cat**].—*Bull. Soc. Path. exot.* **28.** 119-126. 1 table.

Out of eight strains of *E. dysenteriae* cultivated in Dobell-Brumpt medium to which rice starch was added, six had lost their pathogenicity for young cats after three to four months. The other two strains retained their pathogenicity up to two and three months of cultivation. There is some evidence that *E. dysenteriae* cultivated in ordinary media remains pathogenic for cats even after eight months. It is suggested that this loss of pathogenicity may be due to the predominance of saccharolytic flora in cultures containing rice starch, and to the formation of butyric, propionic and lactic acids, which render the cultures acid in reaction.
—U. F. RICHARDSON.

SCHWETZ, J. (1934). Contribution à l'étude des trypanosomes pathogènes des suidés. (Deuxième étude). [**A Contribution to the Study of the Pathogenic Trypanosomes of Swine. (Second Communication)**].—*Bull. agric. Congo Belge.* **25.** 313-346. 21 figs. [11 refs.]

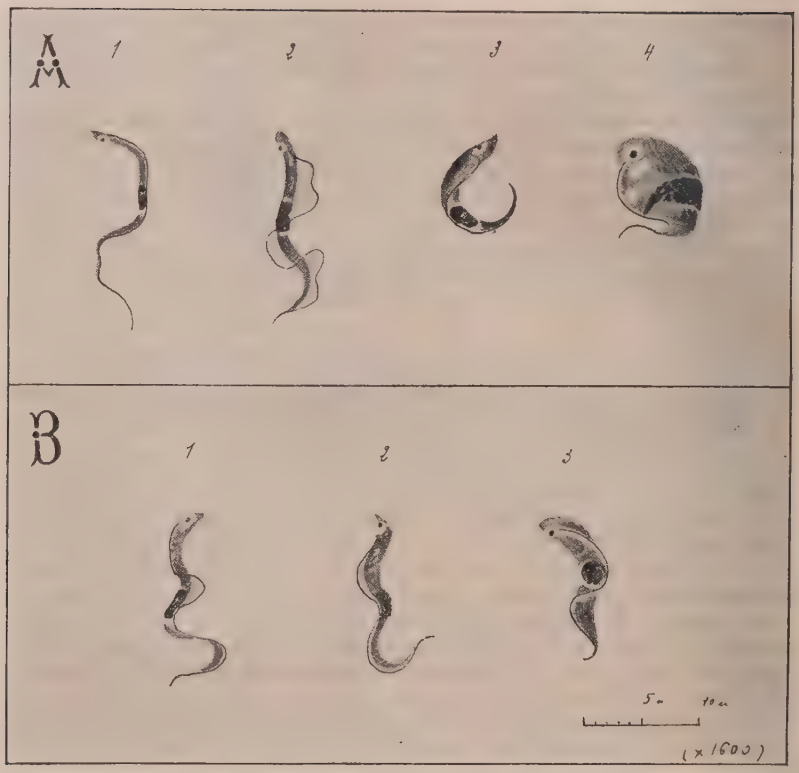
This article records investigations into trypanosomiasis of swine, carried out in connection with three outbreaks of the disease which came under observation. The first two outbreaks exhibited a peracute form, death occurring whilst the animals were in good condition, and without the exhibition of any symptoms of disease. In these outbreaks it was only possible to observe the trypanosomes as they occurred immediately prior to death. In the third outbreak, both acute and chronic forms of the disease were encountered in the same herd of swine, and owing to the regular microscopic examination of the herd, it was possible to observe the initial stages of infections which later developed into the peracute form of the disease.

The trypanosomes associated with these outbreaks exhibited a variety of forms with morphological characteristics which have been ascribed to *T. congolense* (small, no free flagellum and little development of the undulating membrane), *T. montgomeryi* (similar but broader), *T. simiae* (longer, short free flagellum and well-developed undulating membrane) and *T. rodhaini* (long and slender with little undulating membrane but a long free flagellum); intermediate types also occurred. All the forms exhibited a marginal position of the bletharoplast which is considered characteristic of the *T. congolense* group.

In the peracute cases of disease, examined on the point of death, organisms of the *T. simiae* and *T. rodhaini* type predominated, but organisms of the *T. congolense* and *T. montgomeryi* type also occurred. In the initial stages of acute cases only organisms of the *T. congolense* type were detected, but at the peak of infection these were replaced by the mixed types of parasites with the long forms, *T. simiae* and *T. rodhaini* predominating. In cases of chronic disease, *T. congolense* and *T. montgomeryi* types were present, but the long types of trypanosomes could not be detected.

Subinoculation into monkeys, guinea pigs, rabbits, calves and grey and white rats were unsuccessful, but one sheep was infected, and in this animal *T. simiae* types predominated, though *T. congolense* and *T. montgomeryi* forms also occurred. Two passages from the sheep to pigs produced fatal infections with a preponderance of the *T. simiae* type of parasite.

The possibility that a mixed infection was involved is rejected on the grounds that it is improbable that this would occur in three separate outbreaks, and also in view of the intermediate types of parasites which were encountered. It therefore



A. Primary types. 1. *T. rodhaini*; 2. *T. simiae*; 3. *T. congolense*; 4. *T. montgomeryi*.
B. Intermediate types.
Reproduced from *Bull. agric. Congo Belge.*

appeared that a polymorphic trypanosome of the *T. congolense* group was involved. The author discusses the evidence as to the existence of polymorphism in the group, and records that he has detected *T. rodhaini* forms in *T. congolense* infection of the rat, and that, although *T. rodhaini* appeared to be monomorphic in pigs, yet when inoculated into monkeys it assumed a short form with only a short free flagellum. The author suggests that possibly all four types are forms of a single trypanosome, but provisionally suggests the name *T. porci* for the species of swine and suggests that the names *T. simiae*, *T. rodhaini* and *T. montgomeryi* should be discarded. [If it is accepted that *T. simiae*, *T. rodhaini* and *T. montgomeryi* are manifestations of the same trypanosome under different conditions then, under the priority rule of international nomenclature, the name *T. simiae* would have priority, and the name *T. porci* would not be admissible].—U. F. Richardson.

Schilling, C. (1935). **Immunization against Trypanosomiasis.**—*J. trop. Med. (Hyg.).* **38.** 106-108.

This article records experiments carried out in Tanganyika Territory on the immunization of calves to *Tryp. congolense* and *T. brucei*. [See also this *Bull.* **5.**

122. for similar experiments on foals]. Attempts were made to give the calves a preliminary immunity and they were then exposed to infection in an area where no cattle could be kept owing to " nagana ". In one group the preliminary dosage designed to produce resistance was conferred by the inoculation of doses of 50 trypanosomes which sometimes failed to cause infection till the third inoculation. In this group 57 per cent. were still alive after seven months of exposure, against 38 per cent. of the controls. Other attempts were made to confer immunity by a vaccine of dried rats' blood, infection and treatment with subcurative doses of " antimosan ", and the infection of the pregnant mothers. The results were inconclusive.—U. F. RICHARDSON.

JUSSIANT. (1933). Contribution à la prophylaxie des trypanosomiases animales et humaines. [**Contribution to the Prophylaxis of Animal and Human Trypanosomiases**].—*Bull. méd. Katanga.* **10.** 8, 11-12 and 14-15. [Copied *verbatim* from *Trop. Dis. Bull.* **30.** 619. Signed E. E. A.]

Glossina palpalis, which infests the fringing forest along all water-courses in the Lomami-Kasaï region of Belgian Congo, is the most important obstacle to the development of the local stock-raising industry. Precautions are taken to prevent stock from entering these fly-belts ; artificial watering-places are provided, and where there is special liability to infection herds are driven to them after sunset, or at dawn. Besides measures of the usual kind against the fly, extensive use is made of the Harris trap, which is said to give excellent results. As the outcome of all this, the problem of stock-raising on the Lomami is said to have been solved. The Harris trap, manufactured locally, is now in regular use in the stock-raising area, and can equally well be employed for the protection of human communities. It functions best on cleared ground, fully exposed to the sun, three or four metres from the strip of forest along a stream.

CORSON, J. F. (1935). **Experimental Transmission of** *Trypanosoma rhodesiense* **through Antelopes and** *Glossina morsitans* **to Man.**—*J. trop. Med.* (*Hyg.*). **38.** 9-11. [3 refs.]

A strain of *T. rhodesiense* was isolated from a human sleeping sickness patient by the inoculation of blood into a guinea pig, from which it was transferred to other guinea pigs by cyclical passage through *G. morsitans*. The *G. morsitans* fed on these latter guinea pigs were kept singly in tubes, and infected flies identified by feeding on rats. A single infected fly was allowed to bite a dik-dik which became infected, and from this dik-dik the strain was passaged by the fly method through three other dik-diks to a man. The man became infected and white rats inoculated from him exhibited a blood infection of polymorphic trypanosomes with numerous posterior nuclear forms ; he was then treated with " Bayer 205 " and recovered. The author considers that more observation and experimental study of the nature of trypanosome infection of wild and domestic animals in tsetse fly areas should be undertaken.—U. F. RICHARDSON.

RODHAIN, J. (1935). Lésions tégumentaires et localisation parasitaire cutanée chez un cobaye infecté de *Trypanosoma marocanum*. [**Skin Lesions and the Cutaneous Localization of Parasites in a Guinea Pig infected with** *T. marocanum*].—*C. R. Soc. Biol. Paris.* **118.** 829-831. 1 fig. [4 refs.]

The author records observations on chronic disease in guinea pigs produced by atypical strains of *T. marocanum* [trypanosome of the *T. evansi* group]. Areas of dry eczema covered with thick adherent crusts developed in the later stages of infection and, on scarification of these areas, trypanosomes were found to be

numerous in the sero-sanguinous exudate, although no parasites could be detected in the peripheral blood or in the exudate from areas of normal skin.—U. F. R.

FISCHER, F. P., & FISCHL, V. (1933). Elektrophorese von Trypanosomen und Spirochäten. [**Electrophoresis of Trypanosomes and Spirochaetes**].—*Biochem. Z.* **267.** 403-404. 1 table. [9 refs.] [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 222. Signed C. M. W.]

The authors show that trypanosomes and relapsing fever spirochaetes, both in their natural media and in physiological saline solution, whether alive or dead, always make their way to the cathode when brought into an electric field. This property is quite independent of virulence or susceptibility to specific remedies and is the reverse of the behaviour of red blood corpuscles which, as is known, pass to the anode.

PARROT, L. (1934). **The Natural Transmission of Mediterranean Leishmaniasis.** —*Quart. Bull. Hlth. Org. L. o. N.* **3.** 202-219. [Numerous refs.]

This article is a critical review of existing knowledge as to the relationship of the various forms of human, canine and feline leishmaniasis, and their natural methods of transmission. Numerous references are given to recent literature, usually in the form of quotations from the various authors, bearing on the particular point under consideration. The evidence as to the transmission of oriental sore by *Phlebotomus papatassi* and *P. sergenti*, and the transmission of canine visceral leishmaniasis by dog fleas, ticks (*Rhipicephalus sanguineus*) and flies (*P. perniciosus*), is discussed. The author suggests that probably both forms of leishmaniasis are transmitted by species of *Phlebotomus* and that proof of transmission by the bites of these flies will shortly be obtained.—U. F. RICHARDSON.

PÉRARD, C. (1935). Les coccidies et les coccidioses animales. [**Animal Coccidiosis**].—*Rev. gén. Méd. vét.* **44.** 1-16. [25 refs.]

This article reviews the existing information as to the biology of coccidia, and suggests measures for the control of coccidiosis based on the biology of the parasites.

It is stressed that, after the voiding of oocysts, a period must elapse before they become infective and that, for their maturation, suitable temperatures (0° to 38°C.), humidity and oxygen concentration are required. The minimum period required for maturation varies with the species; for *Eimeria perforans* 30 hours are required, whilst *E. stiedae* requires 60 hours. Oocysts are quickly destroyed by desiccation, heat over 40°C. and anaerobic fermentation. The use of disinfectants favours the development of coccidia, as the ripening of the oocyst is not affected, whilst inimical bacteria are checked.

It has been shown that, with suitable conditions of humidity, mature oocysts will retain their vitality for over a year. The coccidia are highly specific for their vertebrate hosts, but ripe oocysts will pass unchanged through the intestines of a heterogenous host, and it is probable that considerable spread of disease is due to dissemination of oocysts which have been carried by wild birds.

Drug treatment of infected individuals is not considered practicable, owing to the difficulty of attacking intracellular stages but, in view of the success claimed for methods based on a reduction of the pH of the intestinal contents and the relative immunity of animals on a milk diet, further investigations on these lines are considered hopeful. The author also considers that there is evidence of ability to acquire immunity, and that further work on methods of vaccination may give valuable results.—U. F. RICHARDSON.

PIRAS, R. (1934). Considerazioni sulla coccidiosi ovina nel " Sinis " di Cabras. **[Ovine Coccidiosis in the " Sinis di Cabras " (Sardinia)].**—*Boll. vet. ital.* **30.** 1770-1771.

It has been observed that, in the Cagliari province of Sardinia, coccidiosis regularly breaks out in sheep after the winter rains. The area is low-lying and contains numerous stagnant pools around which numbers of sheep are grazed and which form excellent places for the sheep to pick up mature oocysts eliminated the previous year. The parasite, *Eimeria arloingi*, attacks young animals, the mortality rate being as high as 90 per cent. The symptoms are acute catarrhal enteritis, emaciation and death in one or two weeks. Outbreaks are much less severe in dry seasons and the losses could be reduced by moving the sheep to higher ground when necessary, cleaning and disinfecting the folds and carefully removing the carcasses of dead animals.—J. A. NICHOLSON.

KNOWLES, R., & DAS GUPTA, B. M. (1934). **Isospora Infection in Indian Cats.** —*Indian med. Gaz.* **69.** 387-398. 10 figs. on 1 plate, 2 tables, 2 graphs. [8 refs.]

This article records investigations carried out on 21 cats in Calcutta. By direct examination of faecal emulsion, oocysts of *Isospora* were detected in two animals only, but by the hookworm concentration method and the Clayton Lane centrifugal flotation method of examination, infection was detected in 14 of the animals. Two different types of oocysts were encountered, one oval, 20 to 32μ in length, and the other egg-shaped, 34 to 48μ long. The first type agrees closely with *I. rivolta* and the second with *I. felis*.

Sections of the small intestine showed that the coccidial infection was confined to the epithelial cells, and there was no invasion of the subepithelial layer. Motile sporozoites were encountered in the contents of the jejunum and ileum, indicating the possibility that the oocysts were able to develop to maturity in the lumen of the gut.—U. F. RICHARDSON.

DELAPLANE, J. P., & STUART, H. O. (1935). **The Survival of Avian Coccidia in Soil.**—*Poult. Sci.* **14.** 67-69. 2 tables. [2 refs.]

The experiments were carried out at the Rhode Island Agricultural Experiment Station, Kingston, U.S.A., on four plots of ground which had not previously been used for poultry, representing different types of soil ; about 300 fowls to the acre were used during the spring and summer of 1931 and 1932. Only two plots were used in 1933 ; with one exception the runs were exposed to direct sunlight.

The chickens were each given small quantities of oocysts when placed in the runs the first year. Tests were carried out immediately after the removal of the birds from the runs and thereafter at three-monthly periods.

Top soil was removed to a depth of approximately half an inch, mixed with one volume of sterile feed to one of soil and given to two chickens from incubators placed in sterile coops. Controls were used for the experiments. The faeces of the chickens were examined daily from the fourth day after the initial feed until the tenth day. The chickens were examined *post mortem* for the presence of oocysts.

The oocysts of avian coccidia were found to survive from these experimental runs from four to nine months following the removal of the chickens. Viable oocysts were found to survive in the woodland run 15 to 18 months after removal of the chickens. No deaths attributable to coccidiosis were noted in the experimental plots after the first summer at which time they had been artificially infected.

It is not stated which species of coccidia were used for this experimental work but it is recorded that a heavy infestation of *Eimeria necatrix* was found at the *post-mortem* examination of one of the chickens.—NORMAN DOBSON.

MLINATS, F., PETROVITCH, D. M., & BABUDER, T. (1934). **Piroplasmosis in the Vardar Banat. Piroplasmosis of Cattle.**—*Jugoslov. vet. Glasn.* **14.** 389-420. 31 figs., 2 maps. [44 refs.] [In Bulgarian: abst from French summary].

A detailed account of the piroplasmoses of cattle in the Vardar Banat, a region in the south-east of Yugoslavia, with a review of the literature on piroplasms of the neighbouring countries. Four separate infections have been diagnosed, *Babesia bigemina*, *B. major* n.sp., *Theileria mutans* and *Th. dispar*. *B. major* occurs in the peripheral blood as a single or double round body or may rarely be quadruple. The commonest forms, however, are single or double pear-shaped bodies.

Boophilus anulatus is held to be the vector of *B. bigemina* infection, and *Ixodes ricinus*, *Hyalomma aegyptium* and *Rhipicephalus bursa* the vectors of *B. major* infection.

Clinically, these infections have to be differentiated from anthrax and haemorrhagic septicaemia.

For treatment, trypaflavine has been found efficacious against *B. bigemina* infection, whilst "ichthargan" is preferred against *B. major* infection. The theileriases cannot be cured with drugs and it is necessary to control them by the eradication of ticks, by removal of sources of infection, and by vaccination according to the method used in Algeria. It is also necessary to acclimatize all imported animals and desirable to place susceptible cattle on alpine pastures during the dangerous season.—J. E.

WERTHEIM, P. (1934). Statističko-faunistička istrazivanja infuzorija iz zeluca Bos taurus L. **[The Ciliates from the Stomach of Bos taurus L.].**—*Vet. Arhiv.* **4.** 394-466. 7 tables, 7 charts. [49 refs.] [Abst. from English summary].

A detailed account of the ciliates found in the rumen of 30 cattle. There is no evidence that any of the organisms were pathogenic.—J. E.

SCHARRER, Berta. (1934). Ueber die Verweildauer von Hühnerspirochäten im Zentralnervensystem von Hühnern und Tauben. **[The Persistence of Fowl Spirochaetes in the Central Nervous System of Fowls and Pigeons].**—*Z. InfektKr. Haustiere.* **116.** 206-208. [2 refs.]

It is concluded that there is no significant difference between the periods that spirochaetes can survive in the brain, blood and other tissues of birds.
—E. J. PULLINGER.

SANDER, F. (1935). Zur Frage der Uebertragung der Weilschen Krankheit durch Schweine. **[The Transmission of Weil's Disease by Swine].**—*Arch. Hyg., Berl.* **113.** 279-282. [3 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **10.** 322-323. Signed R. LOVELL].

The literature concerning the association of swine and Weil's disease, the finding of leptospira in the kidneys and the presence of protective substances in their sera is reviewed and followed by the description of a human case in which direct infection from a pig is assumed. A head slaughterer became ill on 21st April, 1934, and visited his doctor two days later complaining of general pain in the muscles and general lassitude. He was jaundiced and was passing small quantities of dark coloured urine containing albumen, blood cells and hyaline casts. Weil's disease was suspected and later confirmed by serological methods,

although it appears that leptospira were not isolated. A pig slaughtered by the patient on 18th April, 1934, eight days previous to the onset of symptoms, was stated to have been wholly yellow in colour even after fat had been removed. It is assumed that infection had taken place by direct contact probably with blood or urine of the slaughtered pig.

TURGUT, M. (1934). Gansespirochaetose in der Turkei. [**Spirochaetosis in Geese in Turkey**].—*Dtsch. tierärztl. Wschr.* **42.** 801-802. 2 figs. [3 refs.]

Symptoms shown by three geese are described. These include general weakness, a temperature of about 42°C., inappetence and marked thirst. The geese were heavily infested with Argasidae. Large numbers of spirochaetes were seen in smears of the blood of the birds, and they died in spite of treatment with "atoxyl." When blood from these geese was inoculated into fowls and pigeons the spirochaetes failed to establish themselves in either host.—E. J. PULLINGER.

DISEASES CAUSED BY VIRUSES.

—. (1935). **Report of Committee on Miscellaneous Transmissible Diseases.** [**U.S. Live Stock Sanit. Ass.**]—*J. Amer. vet. med. Ass.* **86.** 363-367.

Encephalomyelitis of equines has been shown to be insect-borne and to occur chiefly in the neighbourhood of salt marshes where the principal transmitting agents are salt marsh mosquitoes, notably *Aëdes sollicitans.* Formolized virus vaccine has given encouraging results as an immunizing agent.

A disease, clinically resembling foot and mouth disease, has appeared for the second successive year in California among garbage-fed swine. The virus, however, does not induce lesions in cattle and guinea pigs and shows slight pathogenicity for horses when inoculated on the dorsal surface of the tongue. It is proposed to call the condition "vesicular exanthema". The virus also differs immunologically from that of vesicular stomatitis.—NORMAN BISSET.

KLIENEBERGER, Emmy. (1935). **The Natural Occurrence of Pleuro-Pneumonia-Like Organisms in Apparent Symbiosis with *Streptobacillus moniliformis* and Other Bacteria.**—*J. Path. Bact.* **40.** 93-105. 1 text fig., 14 figs. on 2 plates. [27 refs.]

Interest in the colonial development of the organisms of contagious bovine pleuro-pneumonia and caprine agalactia [see also this *Bull.* **4.** 725.] stimulated the author to search for saprophytic homologues, and in this paper a detailed description is given of two symbiont organisms which have been found in bacterial cultures. Both these organisms reveal a very close resemblance in their morphological development to the causal agents of contagious bovine pleuro-pneumonia and agalactia, and the author considers them to be two new representatives of this group. They are referred to as L 1 and L 2. The former (L 1) was found to be present in all the examined strains of *Str. moniliformis* Levaditi and the latter (L 2) was found in cultures of a streptococcus or streptobacillus obtained from the naso-pharynx of healthy guinea pigs.—GWILYM O. DAVIES.

VITALE, A. (1934). Vaccinazioni contro la peste bovina. [**Vaccination against Rinderpest**].—*Ann. Igiene* (*sper.*). **44.** 150-160. [24 refs.] [Abst. from abst. in *Rec. Méd. vét. exot.* **7.** 170].

The author has immunized 2,800 cattle against rinderpest by inoculating

them with 1 c.c. of virulent saliva, obtained directly from the parotid or maxillary salivary gland, together with a simultaneous injection of 50 c.c. of antiserum per animal. 98 per cent. of the inoculated animals reacted at the end of eight days and thereafter became immune. The post-vaccination mortality was said to be very low.—J. E.

JACOTOT, H., & COLSON, M. (1935). Effets du vaccin contre la peste bovine chez les veaux issus de vaches activement immunisées. [**The Protective Value of Rinderpest Vaccine on Calves the Progeny of Immunized Cows**]. —*Bull. Soc. Path. exot.* **28.** 74-78. 3 tables.

Jacotot and Colson have tested the protective value against rinderpest of inactivated organic extracts on calves, the progeny of artificially immunized dams. The vaccine conferred a similar degree of protection on such calves as on those the progeny of non-immune dams.

The inoculation of a slightly virulent vaccine may, however, overcome their naturally acquired immunity [from the dam] and set up infection similar to that which occurs in susceptible control calves.—T. M. DOYLE.

LIGNIÈRES, R. (1934). Sur la vaccination anti-aphteuse. [**Vaccination against Foot and Mouth Disease**].—*C. R. Soc. Biol. Paris.* **117.** 1009-1010. [3 refs.]

J. LIGNIÈRES found that guinea pigs could be immunized by giving two inoculations, at ten-day intervals, of immune serum and virus simultaneously, the virus being given 4 to 5 cm. distant from the site of the serum inoculation, followed by a third inoculation of virus alone ten days after the second inoculation. The present author modified this method by cutting out the serum of the second inoculation and giving only half of the dose of virus for the second inoculation. The third inoculation was dispensed with. By this method, three out of 23 guinea pigs developed lesions of foot and mouth disease whilst being immunized. The remaining 20 were immune to a test dose of virus, whereas all the controls developed the disease.—A. BROWNLEE.

PIÈROT, M. (1935). Le rôle de l'eau dans la typho-anémie. [**Role of Water in the Epidemiology of Equine Infectious Anaemia**].—*Rev. gén. Méd. vét.* **44.** 193-200. 3 figs.

This paper is a consideration of the role of drinking water in the spread of equine infectious anaemia. The author considers water to be the chief means of dissemination of the disease, but that its role as a vehicle is materially affected by the soil through which it passes. The argument is supported by practical illustrations from his own experience of the disease.—C. DAVENPORT.

NEUMANN-KLEINPAUL. (1934). Anämie beim Pferde. [**Equine Infectious Anaemia**].—*Tierärztl. Rdsch.* **40.** 862-863.

The clinical diagnosis is discussed, the following points being of importance :— very pale conjunctiva and vagina, rapid slowing of the pulse after exertion, swelling of the spleen (best determined *per rectum* after filling the stomach with water by a stomach tube), and the blood sedimentation test. The heart should be examined by the electrocardiogram, if possible.

Anaemia due to tooth disease and to internal parasites must be excluded.—J. E.

WALDMANN, O., KÖBE, K., & PAPE, J. (1934). Vorläufige Mitteilung über die Aetiologie des Hoppegartener Hustens der Pferde. [**Aetiology of Hoppegarten Cough**].—*Berl. tierärztl. Wschr.* **50.** 1-3. [A translation appears in *Vet. Rec.* **14.** 277-280].

Hoppegarten cough is a contagious disease of horses affecting the respiratory system, caused by an ultra-visible, filtrable virus. This produces a catarrhal bronchitis and peribronchitis, together with pulmonary consolidation. No bacteria are present in the primary condition though a secondary broncho-pneumonia, associated with a haemolytic streptococcus, may be encountered. The disease is transmissible to pigs and cattle. [For further information regarding this disease see this *Bull.* **5.** 268 and 419].—E. J. PULLINGER.

WYSCHELESSKIJ, N. S., & SSUCHOW, M. N. (1934). **The Virus of Equine Encephalomyelitis.**—*Sovyet. Vet.* No. 9. pp. 36-44. [Abst. from abst. in *Tierärztl. Rdsch.* **40.** 875].

Tests with viruses from different parts of the U.S.S.R. showed them all to be identical. Pigs, rabbits, cats, guinea pigs, rats and mice were susceptible, whilst dogs and fowls were resistant.

The virus was recovered from the central and peripheral nervous system, but not from the blood of experimental animals.—J. E.

ROSENBUSCH, F. (1934). Ueber die epizootische Enzephalomyelitis der Pferde in Argentinien. [**Epizootic Encephalomyelitis of Horses in the Argentine**].—*Z. InfektKr. Haustiere.* **47.** 48-59. [4 figs.]

In the Argentine this disease has a periodic incidence, being widely distributed throughout the country one year and practically absent the next. Although a 95 per cent. mortality was recorded in one particular stud, usually not more than 40 per cent. show symptoms in an infected area, 2 to 5 per cent. of cases being fatal.

After describing the symptoms and *post-mortem* appearances of the disease, Rosenbusch discusses his observations on the localization of the virus in the tissues and his attempts to produce immunity.

The virus was found in the central nervous system, but only rarely in the brains of naturally occurring cases. It was absent from the liver, kidneys, spleen, urine, milk, red corpuscles and serum.

By subcutaneous, intracerebral and intrapleural injection it was possible to infect guinea pigs. White rats, mice, pigeons, goats and rabbits were also shown to be susceptible, but not dogs, pigs or sheep.

An immunity strong enough to resist infection by the intracerebral route was produced by the use of vaccines prepared from infective brain material treated with chloroform, phenol or saponin. Their efficacy depended upon the viability of the virus which, in the case of the vaccine prepared with chloroform, was of only a few days' duration.

In the horse, subcutaneous injection of untreated infective brain material gave protection against intracranial infection and the use of this method in the field is regarded by the author as having a practical application in parts of the country where the disease already exists.

Comparative tests carried out with a strain of virus obtained from California showed this to be similar to, though somewhat more virulent than, the indigenous strains.—N. S. BARRON.

HOLZ. (1934). Ueber das Vorkommen verschiedener Formen von infektiöser Gehirn-Rückenmarksentzündung der Pferde in Württemberg. [**Occurrence of Different Forms of Infectious Encephalomyelitis of Horses in Wurttemberg**].—*Z. InfektKr. Haustiere.* **46.** 304-327. [63 refs.]

In addition to typical Borna disease, in which no macroscopical lesions of the

central nervous system are to be seen, other types of encephalomyelitis occur in Wurttemberg, though less frequently.

Eighteen of such cases are divided into two groups according to their macroscopical and microscopical appearances. In group 1 there is a marked lemon-yellow discoloration of the grey and white brain tissue. Such brain material usually contains abnormal amounts of iron, which may be demonstrated by treatment with ammonium sulphide when iron deposits show up as black foci. Haemorrhagic foci may be seen and also a brown pigmentation, probably due to the formation of haemosiderin. In group 2 the grey matter shows multiple deseminated foci of haemorrhage which are most characteristic. Excessive deposition of iron is rare and a yellow pigmentation is seldom seen. The above changes serve to distinguish the two classes of infection from Borna disease.

Microscopically all the 18 cases of encephalomyelitis showed perivascular infiltration with lymphocytes, monocytes and neutrophiles, but no clear-cut differentiation existed within the haemorrhagic zone between the condition of tissues of ectodermal origin and that originating from the mesodermal mesenchyme. As in Borna disease, phagocytosis of neurons occurred with the formation of glial foci ; similarly, Joest-Degen nuclear inclusion bodies were seen. The virus which produced the group 1 class of infection was transmissible to rabbits.

The relationship between the viruses causing the above forms of encephalomyelitis and Borna disease is at present obscure.—E. J. Pullinger.

Lourens, L. F. D. E. (1935). Kurze Bemerkungen auf die Arbeit von Köves und Hirt über die Aujeszkysche Krankheit der Schweine. [**Comments on the Work of Köves and Hirt on Aujeszky's Disease in Swine**].—*Arch. wiss. prakt. Tierheilk.* **68.** 418-419.

The author makes brief mention of an outbreak diagnosed as Aujeszky's disease [infectious bulbar paralysis, pseudorabies, mad itch] in swine and other domestic animals which occurred at Bodegraven. This note is published as a result of the statement by Köves and Hirt in an article describing Aujeszky's disease of swine [this *Bull.* **5.** 72.] that the disease had not been encountered in Holland.—E. J. Pullinger.

Verge, J. (1934). L'influenza ou grippe du porcelet. [**Swine Influenza**].—*Rev. gén. Méd. vét.* **43.** 257-267. [14 refs.]

A general review of swine influenza which does not lend itself to abstraction. —R. E. Glover.

Baki, S. (1934). Vergleichende Untersuchungen über verschiedene Immunisierungsverfahren bei Wut. [**Immunization against Rabies**].—*Z. Immun-Forsch.* **83.** 184-196. 4 tables. [17 refs.]

The Högyes, Fermin and Alivisatos methods of antirabies vaccination are compared, the criteria being immunity of the vaccinated subject to artificial infection, and also estimation of the *in vitro* viricidal property of the serum after immunization. The Alivisatos method produces a satisfactory immunity in the shortest time – about ten days. The Fermin and Högyes methods produce reactions more slowly. The intraperitoneal route for vaccination by all three methods produces immunity of longest duration ; in the case of the Alivisatos and Fermin methods it endures for at least 60 and 75 days respectively. The preparation of the Alivisatos vaccine is costly and troublesome.—E. J. Pullinger.

ANDERSON, G. W. (1935). **Rabies Control from the Standpoint of the Health Officer.**—*J. Amer. vet. med. Ass.* **86.** 76-83.

This is a medical man's viewpoint on the control of rabies. He states that whilst restraint measures have been effective in England, in the United States, where there exists a multiplicity of governmental units and no co-operation, such measures have contributed nothing of a permanent nature to the control of the disease. He outlines the development of antidiphtheria inoculation and points to the success which has been achieved by raising the relative resistance of individuals. He suggests that the one-dose method of rabies vaccination would probably be equally as successful. The protection afforded by the method tends to be underestimated owing to the severity of the laboratory tests. If, in return for his licence fee, a dog-owner was granted free inoculation, the author anticipates that considerable progress would be made in the control of this disease.—G. O. D.

HINDERSSON, R. (1935). Kampen mot rabies under åren 1933-34. [**Rabies Control in Finland in 1933 and 1934**].—*Suom. Eläinlääkäril.* **41.** 33-43. 2 figs. [3 refs.] [Abst. from German summary].

Rabies was confined to the south-eastern frontier districts adjoining the U.S.S.R. whence infection enters.

Strict police measures are used for control purposes and preventive vaccination is employed in certain districts. Only two cases of rabies in dogs occurred in 1933 and 22 in 1934.—J. E.

I. NEUHÄUSER. (1934). Beitrag zur Tollwutuntersuchung. [**Diagnosis of Rabies**].—*Berl. tierärztl. Wschr.* **50.** 421-422. 2 figs. [2 refs.]

II. REMLINGER, P., & BAILLY, J. (1934). Sur la présence du virus rabique dans le poumon. [**Presence of the Rabies Virus in the Lung**].—*Ann. Inst. Pasteur.* **53.** 43-50. [5 refs.]

III. GALLOWAY, I. A. (1934). **The " Fixed " Virus of Rabies : the Antigenic Value of the Virus Inactivated by the Photodynamic Action of Methylene Blue and Proflavine.**—*Brit. J. exp. Path.* **15.** 97-105. 8 tables. [8 refs.]

IV. JAUFFRET. (1934). Rage suraiguë. Considérations sur le diagnostic clinique et expérimental. [**Clinical and Experimental Diagnosis of Hyperacute Rabies**].—*Bull. Soc. Sci. vét. Lyon.* **37.** 52-71. [2 refs.]

I. The author describes the use of a staining mixture of methylene blue and fuchsin for the demonstration of Negri bodies, and also a specially constructed iron plate, by means of which dogs' heads can be immobilized whilst the brain is removed, without danger of self-wounding or interference with operative freedom.

II. The lungs of nine animals out of 24 (dogs, cats, guinea pigs and rabbits), inoculated with various street viruses, when freed from blood, were found by animal inoculation to contain virus. There was no evidence that lung tissue is a predilection seat for any particular strain of virus or for any particular species.

III. The fixed virus of rabies, as present in collodion membrane or sand and paper-pulp filtrates, is inactivated by the photodynamic action of methylene blue or proflavine. The latter substance has a similar action on unfiltered suspensions. Virus, inactivated in this manner, appears to preserve some antigenic properties, and in experiments in which a number of doses of such inactivated virus were given intramuscularly, 84 per cent. of the rabbits survived subsequent test inoculations.

IV. Probably owing to the number of stray dogs permitting an exaltation of the virus, peracute rabies is encountered in Indochina, and may easily be confused with pseudorabies. Negri bodies may or may not be present, and the

intracerebral inoculation of brain material into rabbits is not always positive ; the use of salivary gland instead of brain is recommended as giving more constant results. The clinical history is usually diagnostic, and a number of unusual cases are described. The chief symptoms in two dogs were haemorrhagic enteritis and pruritus, followed by death in 24 to 36 hours ; no Negri bodies were seen, but rabbit inoculation proved positive. The two cases were connected, but the incubation period was more than four months. Two other paralytic cases in dogs caused death in 24 hours but, although Negri bodies were demonstrable, inoculations proved negative. A third interesting case involved horses ; a horse became affected with furious rabies, escaped and died while at large ; rabbit inoculation proved negative. Seven days later, its stable companion went down with sweating and pruritus, and died in 16 hours, rabbit inoculation proving positive. Fifteen days later, a horse contaminated by the saliva of the original rabid horse succumbed.

—NORMAN HOLE.

REMLINGER, P., & BAILLY, J. (1935). La rage et le virus rabique au Maroc. [**Rabies in Morocco**].—*Maroc méd.* Feb. 15th. 41-43. [3 refs.]

It is known that strains of rabies virus from Africa and eastern Europe are usually more benign than those encountered in western Europe. The occurrence in Morocco of cases of rabies which have developed in spite of antirabic treatment has suggested that certain indigenous viruses might possess a higher degree of virulence than the normal types. A study of a large number of strains, however, has failed to reveal any general difference between the Moroccan strains and those of eastern Europe, but occasionally strains of exalted virulence have been encountered as well as some which were definitely attenuated.

The authors are of the opinion that fluctuations in the potency of rabies are not confined to any particular locality, but are dependent upon an evolutionary cycle of the virus.—R. E. GLOVER.

MACKENZIE, R. D. (1935). **Immunisation of Mice against Rift Valley Fever.**—*J. Path. Bact.* **40.** 65-73. 5 figs. [13 refs.]

This paper describes a series of experiments on the immunization of mice against the virus of Rift Valley fever, using emulsions inactivated by the photodynamic action of methylene blue [PERDRAU & TODD – this *Bull.* **4.** 237]. In the preliminary trials, Seitz filtrates of infected mouse livers were employed, the animals receiving 1 c.c. of inactivated virus intraperitoneally. When tested 14 days later, they were as susceptible to unmodified virus as the controls.

Better results were obtained when blood was used as a source of virus. The vaccine was prepared by centrifuging a mixture of infective blood and saline and then irradiating the supernatant portion in the presence of methylene blue. The maximum protection was obtained with 1 c.c. of undiluted antigen. It was found that immunity was in direct relationship to the concentration of the virus in the vaccine, the time elapsing between the injection and the test dose (complete protection at the third day and onwards) and the strength of the immunizing dose. Variations in the size of the infective dose were without effect.

Further experiments with formalinized suspensions of highly virulent blood gave a degree of protection comparable to that afforded by irradiated virus. This fact suggests that previous failures with formolinized vaccines may have been due to a deficiency of virus in the emulsions.—R. E. GLOVER.

DOYLE, T. M. (1935). **Newcastle Disease of Fowls.**—*J. comp. Path.* **48.** 1-20. 1 table. [27 refs.]

Newcastle disease, which was first recorded in this country by the author in 1926, has since been identified in the Dutch East Indies, Philippine Islands, India, Korea, Japan, Ceylon and Australia and, with the exception of the last two outbreaks, all the strains have been proved to be immunologically indistinguishable. This article records the results of experiments carried out to show that Newcastle disease, although bearing a superficial resemblance to fowl plague, is a separate entity differing in its period of incubation, symptoms, pathological lesions, pathogenicity for pigeons, and immunologically.

MANNINGER [see this *Bull.* **3.** 80.] includes Newcastle disease and fowl plague under one heading and regards the Newcastle virus as an attenuated strain of the fowl plague virus. Experiments carried out on similar lines by the author did not confirm this.

Cross-immunity tests with the viruses of Newcastle disease and fowl plague and serum-virus neutralization tests clearly showed the two diseases to be distinct.

From the experiments recorded it is seen that the inoculation of pigeons provides a reliable method for the differential diagnosis of the two diseases. Pigeons of all ages are susceptible to artificial infection with Newcastle virus, but are highly resistant to artificial infection with fowl plague virus even in massive doses.—R. F. GORDON.

BLACK, L. M., & BEAUDETTE, F. R. (1934). **Infectious Bronchitis Vaccination.** —*Ext. Bull. N. J. Coll. Agric.* No. 123. pp. 8. 2 figs.

This leaflet describes the technique of vaccination against infectious bronchitis (infectious laryngotracheitis). The vaccine is prepared from live virus and is applied with a brush to the mucous membrane of the cloaca. Five days after vaccination, the birds should be examined for " takes ", a good reaction being shown by inflammation and congestion of the cloacal mucous membrane, with a mucous (sometimes blood-tinged or cheesy) exudate.

Vaccination can be carried out at six weeks of age and, provided that the birds are carefully handled, there is no disturbance of general condition or loss in egg production. Immunity is established in four to nine days after vaccination and, from the present evidence, appears to be life-long.—R. F. GORDON.

SILBER, L. A., & TIMAKOW, W. D. (1935). Ueber Züchtung der filtrierbaren Virusarten auf nichtpathogenen Mikroben. V. Mitteilung. Ueber Steigerung der Virulenz der allophoren Pockenkulturen auf dem Selektionswege. [**Culture of Filter-Passing Viruses on Non-Pathogenic Bacteria. V. Increase in Virulence of Pox Cultures**].—*Zlb. Bakt. I. (Orig.).* **133.** 242-246. 1 fig.

These authors have previously reported that fowl pox virus can become absorbed into yeast cells and can subsequently be found in conjunction with these cells. In order to develop this line of research, mixed yeast-pox virus cultures were grown upon agar plates and 20 of the resulting colonies were picked and examined. The presence or absence of virus from yeast colonies was tested by inoculating emulsions of colonies into guinea pigs and examining them for Paschen bodies after a suitable incubation period. Only three of these colonies (15 per cent.) contained virus. Two of the virus-containing colonies were subcultured, ten colonies being picked from each subculture. Pox virus was demonstrated in 20 and 60 per cent. of these colonies. In the third generation 60 and 70 per cent. of the colonies contained virus, percentages of this order being maintained up to the sixth generation, after which no further tests are recorded. In the first generation positive guinea pig tests were only obtained with culture dilutions of 10^{-3} to 10^{-5}.

In the later generations reactions were obtained with dilutions of 10^{-11}. These findings suggest that pox virus not only survives in conjunction with yeast cells, but also multiplies.—E. J. PULLINGER.

EAGLES, G. H. (1935). **The Preparation and Testing of Elementary Body Suspensions from Vaccinia Filtrates and Their Possible Use in Smallpox Prevention.** —*Brit. J. exp. Path.* **16.** 181-188. 2 tables. [20 refs.]

A method is described for the preparation of rich emulsions of vaccine virus which are free from contaminating bacteria. The pulp from the dermal lesions in a rabbit is suspended in saline, centrifuged to remove coarse particles, filtered through a Berkefeld V candle and then subjected to high speed centrifugation (13,000 R.P.M. for one hour). The deposit containing the elementary bodies is resuspended in broth. Such emulsions are highly potent and retain their infectivity for long periods (reduction from 10^{-8} to 10^{-5} after 400 days at low temperature). The value of these suspensions for the vaccination of human subjects is discussed. —R. E. GLOVER.

WEBSTER, L. T., & FITE, G. L. (1935). **Experimental Studies on Encephalitis. I. Transmission of St. Louis and Kansas City Encephalitis to Mice.**—*J. exp. Med.* **61.** 103-114. 1 text fig., 4 figs. on 1 plate, 1 table. [13 refs.]

Following the successful transmission of " louping ill " to a special breed of mice, similar studies were made with encephalitis material. In this paper the authors show that by injecting the mice intracerebrally with 10 per cent. emulsion of bacteria-free brain tissue a characteristic and fatal encephalitis could be produced. This encephalitis was reproduced in series in other mice by injecting bacteria-free brain emulsion from infected mice.

The lesions in the mice were apparently confined to the central nervous system and consisted of perivascular accumulations of mononuclear leucocytes and the destruction of certain pyramidal cells.—GWILYM O. DAVIES.

STEFANOPOULO, G., MOLLARET, P., & DESNOS, E. (1934). Inoculation du virus de la fièvre jaune au porc. [**Inoculation of the Virus of Yellow Fever into Swine**].—*Bull. Soc. Path. exot.* **27.** 816-820. 5 figs. on 2 plates, 1 chart. [7 refs.]

As Desnos had noticed an illness of pigs in charge of a boy who later died of yellow fever in French West Africa, it was decided to test the susceptibility of pigs to yellow fever.

One pig was infected intracerebrally with a neurotropic strain of virus : it became feverish four days later and died on the seventh day, having shown paralytic symptoms. Yellow fever virus could not be recovered from it, nor were antibodies found in its blood. The *post-mortem* finding was an encephalomyelitis [evidently not due to the specific virus but to the injection trauma].

A second pig was inoculated four times (subcutaneously, intracerebrally, subcutaneously, subcutaneously) with yellow fever virus but remained healthy. —J. E.

DOWNIE, A. W., & MCGAUGHEY, C. A. (1935). **The Cultivation of the Virus of Infectious Ectromelia, with Observations on the Formation of Inclusion Bodies** *in vitro*.—*J. Path. Bact.* **40.** 147-159. 4 figs. on 1 plate, 1 table. [24 refs.]

The virus has been cultivated in a medium containing mouse embryo tissue, mouse serum and Tyrode solution through seven successive subcultures, during

which it is estimated that the virus has multiplied 6×10^{14} times. The growth requirements of the ectromelia virus are not as exacting as those of some viruses, as chick embryo tissue proved equally as suitable as mouse embryo tissue and mouse serum could either be omitted or replaced by heterologous serum. The virus was found to be in greater concentration in the tissue than in the supernatant fluid.

The examination of paraffin sections of tissue fragments from cultures revealed the presence of inclusion bodies, but these took much longer to develop than in skin lesions in mice following intradermal inoculation. They were not a constant feature in cultures and were frequently absent in highly infective material. Inclusion bodies were also formed in chick embryo tissue in passage experiments.—G. O. D.

LEDINGHAM, J. C. G., & GYE, W. E. (1935). **On the Nature of the Filterable Tumour-Exciting Agent in Avian Sarcomata.**—*Lancet.* **228.** 376-377.

—. (1935). **" Elementary Bodies " in Fowl Tumours.**—*Ibid.* 390. [2 refs.]

It is commonly accepted that the elementary bodies of vaccinia and fowl pox can be thrown down by the aid of the high-speed centrifuge and agglutinated by immune sera. This article records the results of applying the same technique to the study of the agents of filtrable fowl tumours. It appears that the infective " agent " can be separated in some degree of purity from potent avian tumour filtrates, by the aid of the high-speed centrifuge, and that the " agent " exists in the form of elementary bodies of smaller size than those of vaccinia. Agglutinins for the corresponding bodies could be demonstrated in the serum of tumour-bearing fowls.

Confirmation of these preliminary experiments would support the view that the " agent " of the filtrable fowl tumours is, either in whole or in part, extrinsic to the fowl and is in the nature of a virus.—R. F. GORDON.

DISEASES CAUSED BY METAZOAN PARASITES.

—. (1935). **Report of Committee on Parasitic Diseases. [U.S. Live Stock Sanit. Ass.]**—*J. Amer. vet. med. Ass.* **86.** 435-442. 1 table.

This report is divided into five parts, dealing respectively with prevalence and distribution of the parasitic fauna, pathology, horse parasite control, parasites in wild life and a control programme for liver fluke disease in Utah. Records of *post-mortem* examinations represent the data from which 32 of the 39 states reporting on the prevalence of parasitism base their figures. Reports on the pathology of parasitism show a high incidence of loss in poultry from parasitism (25 per cent.), and the Committee advocate a systematic survey of the parasites of livestock to form a basis for control.

The report on horse parasite control shows that this has been taken up in ten states to the extent that each of those ten have treated 1,000 or more horses, two states had treated 20,000 horses and one state, Illinois, 50,000 horses.

The report on parasites of wild life shows the prevalence of severe parasitism among deer and among fur-bearing animals.

The control of liver fluke in Utah has been taken up in an energetic way, and a beginning made in a certain heavily infested area ten miles long and six miles wide. Ten tons of copper sulphate were purchased and applied to the heads of streams and to snail-infested areas, as a result of which it is estimated that 98 per cent. of the snails have been killed.—E. L. TAYLOR.

NAGEL, W. O. (1934). **Relationships between Diet and Extent of Parasitism in Bob-White Quail.**—*Wilson Bull.* **46.** 147-149. 1 table. [4 refs.] [Copied *verbatim* from *Exp. Sta. Rec.* **72.** 110].

A comparison of diet and parasitism in bobwhite during 1932-33 and 1933-34, under different conditions of diet, has led to the tentative conclusion that the presence of sorghum cane seed in the diet of bobwhite quail has a restraining effect on parasitism.

SWALES, W. E. (1935). **The Life Cycle of** *Fascioloides magna* **(Bassi 1875), the Large Liver Fluke of Ruminants, in Canada. With Observations on the Bionomics of the Larval Stages and the Intermediate Hosts, Pathology of** *Fascioloidiasis magna*, **and Control Measures.**—*Canad. J. Res.* **12.** 177-215. 24 text figs., 36 figs. on 5 plates, 2 tables. [30 refs.]

As a result of the observations which are reported in this paper, Swales is able to add two snails to the list of known intermediate hosts for this parasite, *Fossaria parva* (Lea) and *Stagnicola palustris nuttalliana* (Lea). He also records the following six new definitive hosts :– the yak, hybrid domestic ox and bison, domestic cattle, Virginia deer, mule deer and wapiti. Rabbits, guinea pigs and sheep were also infected experimentally. The morphology of the parasite is described, and observations are reported on the ecology of the intermediate hosts.

The histopathological study of lesions caused in the definitive hosts suggest that *Fasc. magna* is not a normal parasite of cattle since a closed fibrous cyst usually forms in the livers of these animals, completely enclosing the parasite, and preventing the eggs from reaching the outside world. In deer and, as the few observations given in the appendix suggest, in sheep also, a communication is maintained between this cavity and the bile ducts, and there is a free egress for the eggs. It is, therefore, inferred that the parasite can only complete its life cycle in the presence of deer or sheep.

The development of this fluke in the final host appears to be very slow. Rabbits experimentally infected had not begun to pass eggs even at the end of four months. Applications of copper sulphate to marshy land and the addition of copper sulphate to ponds, etc., containing the intermediate host snail, appeared to be an effective way of obtaining control.—E. L. TAYLOR.

HUDSON, J. R. (1934). **Notes on Some Avian Cestodes.**—*Ann. Mag. nat. Hist.* **14.** 314-318. 3 figs., 1 table. [4 refs.]

The author has examined specimens of *Raillietina numida* from the British Museum collection and in his own collection, corresponding in every way with *R. magninumida* from the guinea fowl, created by Miss JONES in 1930 because of its larger size and greater number of testes, and he considers *R. magninumida* to be a synonym of *R. numida*. Observations are also made on the genus *Killigrewia* Meggitt and its synonymy with *Aporina* Fuhrmann, and a description given of a new cestode from the lesser flamingo. The cestode, a *Hymenolepis*, is named *H. phoeniconaiadis*, apparently the first cestode to be recorded from this bird.
—E. L. TAYLOR.

FERRY, Q. B. (1934). **Studies on Cestoda of Poultry Found in and around Douglas County, Kansas.**—*Amer. Midl. Nat.* **15.** 586-594. 23 figs. on 3 plates. [22 refs.] [Copied *verbatim* from *Exp. Sta. Rec.* **72.** 257-258].

In a study conducted in and around Douglas County, Kans., for the determination of the species and extent of tapeworm infestation of the common fowl, 62 per cent. of those examined were found infested by *Raillietina cesticillus*.

"The number per fowl was fairly constant, except in two extreme cases in which one had 235 worms and the other had 334. Three species of cestodes, *Amoebotaenia sphenoides*, *Choanotaenia infundibuliformis*, and *R. echinobothrida*, appear to be uncommon parasites of domestic chickens of this region. The first was found in 4 per cent. of the fowls, the second in 2 per cent., and the third in 4 per cent. Thirty-eight per cent. of the chickens were parasitized by *R. tetragona*. The threadlike tapeworm *Hymenolepis carioca*, which infested 40 per cent. of the chickens, and *A. sphenoides* were localized in the duodenum."

A list is given of 22 references to the literature.

LANZILLO, V. (1934). Sulla broncopneumonite verminosa dei bovini. [**Verminous Broncho-Pneumonia of Cattle**].—*Profilassi.* **7.** 13-14. [Copied *verbatim* from *Helminth. Abstr.* **3.** 116-117. Signed B. G. P.]

Lanzillo describes an outbreak of verminous bronchitis, diagnosed as due to *Dictyocaulus viviparus* by Alessandrini, among a herd of 200 cattle two of which died. The symptoms were dispersed by a single intratracheal injection of 10 cc. of a 10 per cent. oil solution of chloroform.

HAUTEFEUILLE, J. (1935). Méningite vermineuse. [**Verminous Meningitis**].—*Ann. Parasit. hum. comp.* **13.** 21-27. 1 fig. [12 refs.]

The author describes an interesting case of meningitis in a man. Lumbar puncture first showed the presence of a polynucleosis, which later gave place to a lymphocytosis. The condition began to improve immediately after the expulsion of one *Ascaris lumbricoides*, and it is considered that, through some toxic or anaphylactic action, this parasite had been responsible. [The production of toxic substances is considered by some to be of importance in connection with injury to pigs by *A. lumbricoides*].—E. L. TAYLOR.

FOSTER, A. O., & CROSS, S. X. (1934). **The Direct Development of Hookworms after Oral Infection.**—*Amer. J. trop. Med.* **14.** 565-573. 1 table. [22 refs.] [Copied *verbatim* from *Helminth. Abstr.* **3.** 88. Signed J. N. O.]

Foster and Cross deal with the controversial question as to whether or not lung migration of larval hookworms is essential to their later development. Experiments designed to determine this are described and the authors conclude that larvae of *Ancylostoma caninum* administered orally to the susceptible normal (dog) host are able to develop directly in the alimentary tract without lung migration and that this is the usual manner of development following oral infection of such a host.

—. (1935). **"Bare Strip" Control of Kidney Worm.**—*J. Amer. vet. med. Ass.* **86.** 167.

A method, introduced by the United States Department of Agriculture and first made public through press reports in 1933, is proving very successful in the control of the kidney worm, *Stephanurus dentatus*. It consists principally in preventing young pigs from becoming infected with kidney worms while they are still with the sows. The vegetation is cleared from a narrow strip at the edges of a pasture, where the pigs are likely to lie down, and from a wider strip at one side, where the pigs are fed. There is thus a tendency for the infective material to fall most heavily on parts where the pigs do not graze or root in the earth, but where it is exposed to the direct rays of the sun, which is rapidly fatal to the eggs and larvae of this parasite.—E. L. TAYLOR.

SPINK, W. W. (1934). **Effects of Vaccines and Bacterial and Parasitic Infections on Eosinophilia in Trichinous Animals.**—*Arch. intern. Med.* **54.** 805-817.

5 charts. [15 refs.] [Copied *verbatim* from *Helminth. Abstr.* **3.** 93-94. Signed P. A. C.]

Spink shows that in trichinosed guineapigs, the eosinophilia is reduced following secondary infections with virulent *Bacillus tuberculosis*, *Staphylococcus aureus* and *Trypanosoma equiperdum*. After repeated injections of typhoid vaccine, however, a rise occurred in the eosinophile count. No change occurred after injection of heat-killed *B. tuberculosis*.

The method of encystment of *Trichinella spiralis* larvae does not appear to be related to the number of eosinophiles circulating in the peripheral circulation. But in animals with superimposed tuberculosis or trypanosomiasis, there is less than normal reaction in the muscles round the encysted larvae, owing to the fact that the host's powers of resistance are devoted primarily to resisting the more virulent and often fatal bacterial or protozoan infection.

CHIKMATH, N. C. (1934). **A Case of *Filaria medinensis* in a Dog.**—*Indian vet. J.* **11.** 120. [Copied *verbatim* from *Helminth. Abstr.* **3.** 101. Signed R. T. L.]

This brief clinical note deals with the treatment by the application of an ointment " Naroocha-Vairi " in a case of guinea-worm in a dog in Kolhapur, India.

IMMUNITY.

SHWARTZMAN, G. (1935). **Phenomenon of Local Skin Reactivity to Bacillus Tuberculosis. I. Skin-Preparatory and Reacting Potencies of Tuberculin, O.T. and Bacillus Tuberculosis Culture Filtrates.**—*J. exp. Med.* **61.** 369-382. 5 tables. [13 refs.]

These experiments describe an attempt to elicit local skin reactions to tuberculin in normal rabbits. The animals were prepared by a single intradermal injection of tuberculin (O.T.) or purified tuberculin protein (T.P.T.) : 24 hours later they received an intravenous injection of a bacterial filtrate – *Salmonella typhi* (formerly *Bact. typhosum*) or meningococcus. Alternatively, the heterologous bacterial filtrates were inoculated intradermally and the tuberculin intravenously.

It was found that O.T. contained in low concentrations the factor necessary for eliciting the Shwartzman reaction. Seibert's T.P.T. was completely inactive, but a similar product prepared by the author was potent ; moreover, there was no uniformity in the results with different batches of O.T.

It is suggested, therefore, that the phenomenon of local skin reactivity is not necessarily related to the tuberculin substance proper.—R. E. GLOVER.

I. CLARK, L. T., EMMETT, A. D., & BIRD, O. D. (1934). **The Preparation of Seibert's Tuberculin-Protein (*T.P.T.*) for Diagnostic Purposes.**—*Amer. Rev. Tuberc.* **30.** 471-477. 2 tables. [5 refs.]

II. APPEL, J. M., DOUGLAS, B. H., ROSENBUSCH, Teckla, & WILLIS, H. S. (1934). **A Note on Comparative Testing with Seibert's Tuberculin-Protein (*T.P.T.*).** —*Ibid.* 478-481. [4 refs.]

III. BARNWELL, J. B., & POLLARD, H. M. (1934). **A Comparison of Old Tuberculin with Tuberculin Protein T.P.T.**—*Ibid.* 482-504. 9 tables, 5 charts. [15 refs.]

I. It is pointed out that T.P.T., which is produced as a stable, dry powder, is sufficiently potent to induce skin reactions in tuberculous human subjects in a dose of 0·0001 mg. This amount is so small that it is impracticable for clinicians

to weigh out with accuracy the requisite quantity. This difficulty is overcome by combining known amounts of an alkaline solution of T.P.T. with a fixed weight of lactose in the form of sterile tablets which are readily soluble.

[T.P.T., as described in this and other papers – this *Bull.* **3.** 260. – is the same as tuberculin protein M.A.-100 – MASSUCI & MCALPINE. (1930). *Proc. Soc. exp. Biol., N.Y.* **27.** 661. T.P.T. is prepared by ultrafiltration and precipitation with trichloroacetic acid, while M.A.-100 is obtained by salting out followed by alcohol precipitation].

II. T.P.T. tablets, as described above, were compared with O.T. and with an ultrafiltrate prepared by filtration and dialysis. Approximately 1,200 human patients were tested cutaneously. It was considered that T.P.T. was preferable to the other products because of its high potency and stability in the dry state and of the avoidance of reactions attributable to any constituent other than tuberculin protein.

III. A similar report to the above in which a fair degree of correlation between O.T. and T.P.T. was obtained. It has been suggested [ARONSON & NICHOLAS. (1933). *J. Immunol.* **25.** 483.] that, as is the case with laboratory animals, human subjects may become sensitized by repeated injections of undenatured tuberculin protein. Accordingly, some of the patients were subjected to repeated injections of the two tuberculins at frequent intervals. The reactions to T.P.T. tended to increase when compared with those induced by O.T. Nevertheless, a series of experiments in very young children indicated that, while the possibility of sensitization was not disproved, some other factor was probably responsible for these reactions. [The question of sensitization to tuberculin protein may be of importance in cattle tested with synthetic medium tuberculins].

—R. E. GLOVER.

MAGATH, T. B. (1934). **Large Doses of Tuberculin in Testing Guinea Pigs Inoculated for Diagnostic Purposes.**—*Amer. J. med. Sci.* **188.** 403-409. [11 refs.]

The author surveys briefly the various methods and devices that have been employed for shortening the time necessary for the diagnosis of tuberculosis by guinea pig inoculation. For one reason or another no method has proved entirely satisfactory.

Magath recommends that guinea pigs inoculated with material suspected of containing *Mycobact. tuberculosis* should be subjected to the subcutaneous tuberculin test using 0·5 c.c. O.T. tuberculin. More than three-quarters of the positive animals will die within 48 hours, and a saving of about three weeks will be effected. Only about one in 30 of those that survive eventually prove to be tuberculous.

—T. M. DOYLE.

KARSTEN. (1935). Die Verwendung der mit dem Blut- und Milchserum angestellten Komplimentbindungsreaktion bei der Durchführung des freiwilligen Tuberkulosebekämpfungsverfahrens. **[Complement-Fixation Test for the Diagnosis of Bovine Tuberculosis].**—*Dtsch. tierärztl. Wschr.* **43.** 101-104. 5 tables. [1 ref.]

Samples of bronchial exudate from 1,436 bovines were examined microscopically, and in 385 instances acid-fast bacilli were demonstrable. Serum of 310 of these animals gave strongly positive reactions to the complement-fixation test. In 168 instances the microscopic examination gave doubtful results, whilst, of these, 92 gave positive serological reactions. In 105 instances of the 168, results were checked by guinea pig inoculation and tubercle bacilli were demonstrated in

81 cases, but in 50 cases where tubercle bacilli were isolated the complement-fixation test of the bovine blood was negative. Out of 883 instances in which the microscopical finding was negative, the serological test was positive 85 times, whilst from 219 negative serological reactors tubercle bacilli were isolated in 61 instances by guinea pig inoculation.

From these figures it would appear that a strongly positive serological reaction is probably indicative of active, open tuberculosis, whilst a negative reaction probably indicates the absence of such lesions. The test is not, however, entirely reliable.

Similarly, if samples of whey from individual quarters of an udder are examined, the complement-fixation test gives results which generally, but not always, agree with microscopic and biological tests. [Obviously a serological test of whey cannot indicate whether tubercle bacilli are present in, or absent from, a milk sample. The result of such a test is merely a modified reflection of the antibody content of the blood serum].—E. J. PULLINGER.

McCARTER, J., WISNICKY, W., & HASTINGS, E. G. (1934). **The Precipitin Test as a Means of Diagnosis of Tuberculosis in Cattle.**—*Amer. Rev. Tuberc.* **30.** 584-587. 2 tables. [6 refs.]

The authors carried out precipitin tests with 168 samples of sera obtained from tuberculin-reacting cattle. The antigen was prepared from an avirulent human strain of the tubercle bacillus grown for three months on Dorset's synthetic medium and subjected to Seibert's ultrafiltration method.

Precipitins were found in only a very small percentage of the sera examined; more than half the cattle with negative sera were as extensively affected with tuberculosis as animals with positive sera.

The authors consider the precipitin test to be of no diagnostic value for bovine tuberculosis.—T. M. DOYLE.

SARNOWIEC, W. (1935). Sur la production des anticorps spécifiques par l'injection de filtrats de cultures de *Brucella abortus* chez les animaux tuberculeux ou vaccinés par le BCG. **[The Production of Specific Antibodies by the Injection of Culture Filtrates of *Br. abortus* in Tuberculous Animals or in those Vaccinated with BCG].**—*C. R. Soc. Biol. Paris.* **118.** 1162-1164.

As the antibody production after injection of living *Br. abortus* is much greater in tuberculous animals than in healthy ones, the author experimented with guinea pigs to see if a similar result followed injection of culture filtrates of *Br. abortus* into tuberculous ones or into those vaccinated with BCG or killed bacilli.

The agglutination titre compared with normal controls was increased from 1 : 100 to 1 : 300 in tuberculous guinea pigs, and remained practically unaltered in the other two groups.—C. V. WATKINS.

FELDMAN, W. H., MANN, F. C., & OLSON, C., Jr. (1935). **The Spontaneous Occurrence of Brucella Agglutinins in Dogs.**—*J. infect. Dis.* **56.** 55-63. 2 tables. [10 refs.]

It has been shown by agglutination tests that 52 (10·4 per cent.) of 500 sera of adult dogs from rural environments possessed agglutinins against brucella. The antigen consisted of a carbolized suspension of several strains of brucella isolated from swine, and one from a goat. Of the 52 positive cases, 15 reacted at 1 : 12; 30 at dilutions from 1 : 25 to 1 : 100, and three at 1 : 200 to 1 : 400. Incomplete agglutination occurred with the sera of four dogs at 1 : 12 to 1 : 25.

Attempts to isolate *Br. abortus* by inoculation of tissues into guinea pigs from 14 reacting animals were unsuccessful. Dissemination of infection from reacting dogs by cohabitation with normal dogs was also not successful. None of the dogs with agglutinins for brucella exhibited symptoms of infection and in none of those examined *post mortem* was there pathological evidence of disease due to *Br. abortus*.

No cross-agglutination of any significance occurred using the sera of dogs or rabbits with *Br. abortus* and *Br. bronchiseptica*.—R. Lovell.

Ninni, C., Sarnowiec, W., & Pezzangora, F. (1935). Activation *in vitro* du pouvoir agglutinant spécifique des anticorps brucelliques par les sérums non spécifiques. [**The Activation *in vitro* of the Specific Agglutinating Power of Brucella Antibodies by Non-Specific Sera**].—*C. R. Soc. Biol. Paris.* **118.** 1056-1058. [1 ref.]

The authors tested the agglutinating power of 14 specific anti-brucella sera with and without the addition of 53 non-specific sera. They found that one-fiftieth part of human or animal serum (especially horse serum), non-heated and preserved in the cold for less than 15 days, increased the agglutinating power of specific sera two or three times, hastening the reaction and giving clear-cut reactions for infected cattle sera otherwise of a titre less than 1 : 100. Heating non-specific sera to 56°C. for 30 minutes reduced the above influence.

The addition of one-fiftieth part of fresh non-specific sera (especially human) increased the phenomenon of zone reaction when read after 90 minutes, while fresh healthy guinea pig serum diminished it.

Activation was slightly more when sera from tuberculous guinea pigs, rabbits and human beings were used.—C. V. Watkins.

I. Mirri, A. (1934). Diagnosi delle brucellosi negli animali : la Brucellina Mirri. [**Diagnosis of Brucella Infection in Animals : " Mirri " Brucellin**]. —*R. C. Accad. Lincei.* Ser. 6. **20.** 210-214. 3 plates.

II. Mirri, A. (1935). La Brucellina " Mirri ". Ulteriori esperimenti. [**Further Experiments with " Mirri " Brucellin**].—*Clin. vet., Milano.* **58.** 35-40. 2 figs. on 1 plate, 4 tables.

I. " Mirri " brucellin, a new diagnostic agent for use in the control of brucellosis, is prepared by growing several different strains of brucella in flasks of 1 per cent. glucose broth which are incubated for 20 to 30 days. To each flask is then added 0·5 per cent. formalin and also a quantity of agglutinating serum sufficient to clarify the medium completely. The clear liquid is decanted, tested for sterility, and inoculated in the infra-palpebral subcutaneous tissue in doses of 0·5 c.c. for sheep and goats and 2·5 c.c. for bovines. It retains its potency for at least two months, possibly longer. A positive reaction is very evident and definite, consisting of a firm, fibrous, and entirely painless swelling of the lower eyelid. This swelling, which appears after one to three days, is particularly obvious when viewed from the front and compared with the other eyelid, and persists for at least three days. In negative cases the eyelid remains normal. Doubtful reactions are exceptional. From tests on cattle, sheep, and goats, the author concludes that his method is much more accurate and reliable than the agglutination test, particularly as its efficacy is not influenced by vaccination with dead organisms.

II. Further experiments with " Mirri " brucellin have confirmed the previous conclusions.

It has been found to retain its activity after four months from the date of preparation and it is probable that it persists for even longer. A swelling may

appear at the site of the inoculation (especially in cattle) half an hour after inoculation, but it is non-specific and disappears in a short time. The typical reaction does not appear until one to three days after inoculation and usually persists for from three to five days, although it has been observed up to a month later.

—NORMAN BISSET.

BEACH, B. A. (1935). **The Influence of Bovine Serum on Brucella Infection in Guinea Pigs.**—*J. infect. Dis.* **56.** 38-40. 1 table. [3 refs.]

The work of GWATKIN on the administration of fresh bovine serum, its toxicity for guinea pigs and inhibitory effect on brucella infection in guinea pigs is reviewed and confirmed. The author describes a series of experiments carried out to determine the protective power of normal bovine serum showing high bactericidal power in guinea pigs exposed to brucella infection. Whilst at the moment it is of small practical value, the administration of such serum retards infection.—A. L. MULLEN.

GOLDSWORTHY, N. E., & RUDD, G. V. (1935). **Complexity of Antigens in Relation to Zones in the Precipitation Reaction.**—*J. Path. Bact.* **40.** 169-185. 6 tables. [50 refs.]

Zone phenomena are common in immunity reactions and, although it is more usual to encounter a single zone of optimal reaction, the occurrence of two or three optima is known. Using serum proteins and corresponding antisera, the authors reached the conclusion that multiple zones are due in part at least to the independent activity of multiple antigens and their specific antibodies. It is added that the preparation of pure proteins by chemical methods may not be satisfactory from the immunological point of view, as proteins similar chemically may show differences using immunological technique. Absorption of precipitins is a useful method of eliminating a given antigen from a mixture, provided that due regard is paid to the principle of optimal proportions.—R. LOVELL.

SABIN, A. B. (1935). **The Mechanism of Immunity to Filterable Viruses. I. Does the Virus combine with the Protective Substance in Immune Serum in the Absence of Tissue? II. Fate of the Virus in a System consisting of Susceptible Tissue, Immune Serum and Virus, and the Role of the Tissue in the Mechanism of Immunity.**—*Brit. J. exp. Path.* **16.** 70-84 and 84-101. 16 tables. [39 refs.]

I. In this investigation the viruses used were vaccinia, B virus and the virus of Aujeszky's disease. These were selected because they could be thrown out of a suspension by centrifugation at 12,000 to 14,000 R.P.M. for three hours, and thus their fate after exposure to immune serum *in vitro* could be determined by resuspending in saline and testing on susceptible animals.

Berkefeld filtrates of vaccinia virus were mixed with a slight excess of immune and with normal sera, incubated for four hours and placed in the cold room for intervals of 2, 7 and 14 days. These mixtures were all non-infective. After ultra-centrifugation, the sediment was found to contain virulent virus which infected to the same titre as the sediment from the normal serum mixture. Tests with B virus and pseudo-rabies virus gave similar results.

Mixtures of immune vaccinia serum and vaccinia virus (the virus in excess), incubated for four hours and then kept at room temperature for 24 hours, were filtered through a Seitz filter to remove virus and the filtrate tested for immune bodies. It was found that the filtrate protected against virus to the same titre as untreated serum.

Mixtures of immune sera with homologous virus-infected tissue, on incubation and subsequent filtration, showed that absorption of immune bodies by the tissues did occur, but the same degree of absorption occurred when heterologous virus tissue was used.

II. A Berkefeld V filtrate of highly virulent vaccinia-infected testis was added to a mixture of hyperimmune anti-vaccinial serum and minced rabbit testis (from a half-grown rabbit) and incubated in a Carrel flask at 37°C. for two and a half hours and for three days. Similar mixtures with normal serum acted as controls. After incubation, each culture was lightly centrifuged and the supernatant fluid drawn off. The tissue was washed in Tyrode's solution, centrifuged and the process repeated three times to remove loosely attached virus and serum. The tissue was then ground up, suspended in Tyrode's solution and titrated on rabbits. The supernatant fluid was tested, then ultra-centrifuged and the sediment titrated on rabbits.

Both tissues were found to have a high titre of virus. The immune serum-treated tissue was as infective on dilution as the normal, though the lesions were less extensive. In this experiment, virus did not multiply in the normal serum culture, possibly due to a contamination which was present. After three days' incubation, the " whole " supernatant fluid of the immune serum culture was non-infective, but the sediment was as infective as that in a normal serum culture in which the virus had not multiplied.

Tissue treated with immune serum and washed once was still protected against virus. Virus was able to grow in such tissue after it had been washed three times. This observation was checked by similar work on pseudo-rabies. It was found that, with this virus, inclusions were formed in the tissue previously treated with normal serum and not in that treated with immune serum, but in immune serum-treated tissue, washed three times, a few inclusions were formed.

To test the effect of immune serum on tissue *in vivo*, areas of the skin of a rabbit were infiltrated with anti-vaccinial serum and, after an interval of 72 hours, these areas, along with untreated areas in the same rabbit, were inoculated with virus. The treated areas were immune, whereas the untreated were not.—A. B.

SABIN, A. B. (1935). **The Mechanism of Immunity to Filterable Viruses. III. Rôle of Leucocytes in Immunity to Vaccinia. IV. The Nature of the Varying Protective Capacity of Antiviral Serum in Different Tissues of the Same Species and in the Same Tissues of Different Species.**—*Brit. J. exp. Path.* **16.** 158-168 and 169-180. 10 tables. [15 refs.]

III. Berkefeld V filtrates of vaccinia were used throughout this experiment. Virus was mixed with a suspension of normal rabbit leucocytes in the presence of normal serum and also of immune serum. As in the case of the minced testes used in the previous work referred to above, leucocytes also are capable of fixing virus in the presence of both normal serum and immune serum, but in neither case was the virus destroyed, as the cells were still infective when washed, though the whole immune serum-virus-leucocytes mixture was non-infective. Leucocytes also were found capable of fixing immune substance which could be removed by profuse washing.

To test for the presence of opsonin in immune serum, virus was incubated with normal and immune serum. The virus was then separated by centrifugation and reconstituted in saline. Leucocytes were added and kept in contact for three and a half hours in a shaking machine. The leucocytes were as infective in the immune serum-treated virus as in the normal serum-treated virus.

An immune rabbit was inoculated intravenously with vaccinia virus. Washed

leucocytes from this animal were found to contain virus both at three and at 24 hours after inoculation, though after both these intervals the whole blood was non-infective.

IV. Rabbits inoculated with vaccinia virus were found to be equally as susceptible when inoculated by the intracutaneous route as when inoculated by the intracerebral route, when infection was determined by the presence of immunity in the case of recovered animals.

Rabbits inoculated intracerebrally and intracutaneously with the same amount of a serum-virus mixture (after incubation for four hours at 37°C. and in the cold room for 14 days) showed that, whereas no lesions developed after intracutaneous inoculation, the intracerebrally inoculated rabbit developed symptoms and died. Even by increasing the amount of serum and decreasing the amount of virus to about one M.I.D. [minimal infective dose] it was not possible to protect rabbits against infection, as they either showed symptoms and died or, if they survived they showed fever and were subsequently immune.

Working with the B virus it was found that 100 times the amount of anti-B serum, which would protect a rabbit against 50 to 500 M.I.D. when inoculated intracutaneously, failed to protect against approximately one M.I.D. inoculated intracerebrally, yet the M.I.D. for the rabbit was found to be about the same both by the intracutaneous and the intracerebral routes.

Similarly, experiments showed that, when varying mixtures of pseudorabies virus and anti-pseudorabies serum were inoculated subcutaneously into rabbits, these were not protected even by large amounts of serum when the dose of virus was over a certain (quite small) number of M.I.D.

The M.I.D. of pseudorabies, inoculated intracutaneously or intranasally into a guinea pig, is about the same as that for the rabbit by the subcutaneous route, yet mixtures of serum virus, which did not infect when inoculated into rabbits subcutaneously, did infect guinea pigs when inoculated intracerebrally. The nasal mucosa of the guinea pig appeared more easily protected than either of these tissues.—A. Brownlee.

Teale, F. H. (1935). **Some Observations on the Relative Importance of the Reticulo-Endothelial Tissues and the Circulating Antibody in Immunity. I. Bacterial Immunity in Relation to the Rôle played by the Circulating Antibody and the Tissues following Intravenous Introduction of the Bacteria.** —*J. Immunol.* **28.** 133-160. [11 refs.]

The author has studied the removal of bacteria from the peripheral circulation. In the first series of experiments, rabbits were inoculated with bacteria against which they possess no naturally occurring antibodies. Samples of blood were taken at intervals, and the number of colonies per c.c. of blood estimated. In each case it was found that the bacteria are rapidly removed from the peripheral circulation, and blood smears showed that they accumulate in the central organs, entangled in masses of fibrin and blood platelets. Highly virulent pneumococci and *Bacillus anthracis* of direct animal origin were the only bacilli which were not removed from the circulation. Experiments showed that this is due to the fact that they are not phagocytable in normal rabbits. Experiments on rabbits, guinea pigs and cats showed that the inoculation of anti-coagulants with the bacteria slows up the rate of their removal from the peripheral circulation. It is concluded that the bacteria act as foreign particles, which tend to sediment in the slowly circulating blood in the wide capillary bed of a central organ, causing incipient fibrin formation and the accumulation of blood platelets. It was also found that an immune animal can clear its circulation and prevent bacteriaemia, although its blood is unable to

confer passive protection on mice or rabbits, and contains no agglutinin nor precipitin. The author concludes that the chief factor in immunity is the state of the tissues towards the infecting bacteria.—F. BLAKEMORE.

PANISSET, L. (1935). La variabilité des groupes sanguins et leur limitation en clinique (chez les animaux domestiques). [**Variability in Blood Groups in Domestic Animals**].—*Rev. Path. comp.* **35.** 138-142. [17 refs.]

It has been possible to recognize blood groups in horses, cattle, sheep and pigs. The groups, however, are not so distinct as those of man and only in the horse can four groups be distinguished. In this animal, the grouping becomes complicated by the fact that two types of A corpuscles and serum exist. In the dog, ass, cat and goat, blood groups are not distinct. The question of blood donors is not of such importance in veterinary medicine as in human medicine, since the phenomenon of agglutination is not well marked in domestic animals. —J. A. NICHOLSON.

ROMANOFF, & HOLOPOFF. (1934). **Preparation of Serum against Malignant Oedema of Sheep.**—*Sovyet. Vet.* No. 11. pp. 21-23. [Abst. from French summary].

The authors, working at the Ukrainian Institute of Experimental Veterinary Medicine, hyperimmunized a heifer, a ewe and six rabbits, using anatoxin of *Clostridium septique*. Details of the preparation are given. The activity of the sera of these animals was tested on guinea pigs and then on sheep. The authors conclude that anatoxin prepared for active immunization may also serve as a good antigen for the preparation of a specific active antiserum against malignant oedema of sheep.—C. V. WATKINS.

DISEASES, GENERAL.

LEONARD, H. B. (1935). **The Present Status of Cattle Disease Elimination in New York under the Jones-Connally Bill.**—*Cornell Vet.* **25.** 44-49.

This elimination scheme is a three-fold one and embraces tuberculosis, bovine contagious abortion and mastitis. The scheme of compensation for tuberculous animals slaughtered is based on a federal allowance along with a state grant and this, coupled with the salvage, appears to provide a satisfactory scheme. The average valuation was $54 ; the farmer received an average of $20 federal indemnity and $25 from the State, an average of $9 salvage being added ; the owner thus received full value for the reactor.

Bovine contagious abortion is tackled in a similar manner as regards compensation ; the agglutination must be complete at a dilution of at least 1 : 100 and reactors to the latter test or to tuberculin are branded.

An owner wishing to receive state aid and advice for mastitis must also sign a contract that he is willing to submit his herd to a blood test for bovine contagious abortion within a stated period. Cows showing marked physical evidence of mastitis are slaughtered and federal compensation is paid.—JOHN REID.

BEHN, P. (1935). Ein 20-Jahresplan zur Sanierung der Milchviehbestände Deutschlands. [**A 20-Year Plan for Cleaning up the Dairy Herds of Germany**].—*Tierärztl. Rdsch.* **41.** 54-57.

Eradication of tuberculosis and of bovine contagious abortion is possible, since reliable diagnostic methods for each disease are available. Control must

first be exercised in the breeding herds. Eradication in the dairy herds would be a more gradual process. All herds should be classified as being infected, in the course of cleansing, or non-infected. The process of cleansing an infected herd should take from three to five years. During this period animals would have to be tested periodically, and reactors to the tuberculin or contagious abortion agglutination tests would be slaughtered. In the non-infected herds, mastitis must be kept under control and it should then be possible to sell the milk at an increased price. Periodically all engaged in handling cattle must be examined for evidence of open tuberculosis.—E. J. PULLINGER.

ADSERSEN, V. (1934). Undersøgelser vedrørende Svinesygdomme. **[Investigations into Diseases of Swine].**—*Medlemsbl. danske Dyrlaegeforen.* **17.** 607-627. 1 fig., 1 table, 3 charts. [8 refs.]

The author gives a brief collective survey, especially of the diseases occurring in young pigs, based upon the investigations previously published by him. In 1933 paratyphoid in swine was notified in about 90 herds. The circumstances under which a great number of these enzootics occur indicate that paratyphoid bacteria in swine may occur as normal flora of the intestine and that in cases of accidental lowering of the resistance of the animals they may become able to invade the blood stream.

Among the 4,000 carcasses of swine sent in for examination, 12 were found to have died of septicaemia due to pasteurella and 43 of lobar pneumonia (virulent pasteurella infection), whilst within the same material there were 883 cases of other forms of pneumonia. Thus it is comparatively rare to find infections with highly virulent pasteurella strains. These infections presumably occur in herds in the same manner as paratyphoid and Texas fever. The contagion need not be of external origin. In the case of the diseases of the lungs that run a more chronic course, the author strongly emphasizes the relation to lowered resistance in pigs a few weeks old and points out the great importance in this respect of the anaemia of suckling pigs. In this connection reference is made to the investigations carried out by KÖBE concerning swine influenza [see this *Bull.* **5.** 271]. The author's objection to these experiments is that the important factor represented by the anaemia of suckling pigs has not been considered. Experimental transmission of swine influenza is only successful in piglets up to the age of four weeks, i.e. just within the period in which the anaemia prevails. It has been possible in controlled experiments to obviate the mortality solely by preventing the anaemia. If the swine influenza virus of KÖBE had been present in the author's experimental herd, its effect must be said to have become neutralized by the anti-anaemic treatment.—H. C. BENDIXEN (COPENHAGEN).

BUNYEA, H. (1935). **Report of Committee on Transmissible Diseases of Poultry.** —*J. Amer. vet. med. Ass.* **86.** 432-433.

The report is very short as there is no decided change in the field of poultry disease throughout the country. While satisfactory progress has been made in the study of fowl pox, tuberculosis, *Salmonella pullorum* infection and infectious laryngotracheitis, it is pointed out that further research is necessary in the case of respiratory infections, fowl paralysis, paratyphoid, etc., the use of hygienic measures being the only method of control available at present.—J. E. WILSON.

GMELIN, W. (1935). Die Mondblindheit und Verwandtes. **[Periodic Ophthalmia, etc.].**—*Berl. tierärztl. Wschr.* **51.** 97-101. [25 refs.]

This article consists of a discourse upon present-day knowledge of periodic

ophthalmia and various forms of encephalitis. The author considers that periodic ophthalmia is closely associated with encephalitis and that the primary cause will be found to be the latter condition. Apart from specific infections such as Borna disease, encephalitis consists essentially of an increased functional activity of connective tissue elements as a result of inflammation. It is not clearly understood what produces such inflammation, but it is possible that protein material, resulting from verminous infestation, may reach the brain *via* the blood stream and there stimulate an inflammatory process.—E. J. PULLINGER.

MERRILLAT, L. A. (1934). **The Etiology of [Equine] Periodic Ophthalmia.**—*J. Amer. vet. med. Ass.* **84.** 100-101. [1 ref.]

It is advocated that those who investigate the condition known as periodic ophthalmia in horses should bear in mind the work of VAN SCILLY (1914), STOCK (1929) and MANNINGER (1930). All these workers showed that it was possible to produce an anaphylactic ophthalmia. Anaphylaxis as a cause of periodic ophthalmia would not contradict any theory of a helminthic cause of the disease, since parasitic worms are known to produce substances having allergic properties.—E. J. P.

I. PHÉLOUKIS, T. (1934). Sur la virulence des produits pathologiques et sur les modalités qui régissent la contagion dans la paraplégie infectieuse du cheval. [**Virulence of Pathological Products which affect the Contagiousness of Equine Infectious Paraplegia**].—*Bull. Acad. vét. Fr.* **7.** 257-262. [1 ref.]

II. PHÉLOUKIS, T. (1934). Sur la nature intime des altérations anatomiques observées dans la paraplégie infectieuse du cheval. [**Nature of the Anatomical Changes seen in Equine Infectious Paraplegia**].—*Ibid.* 279-281.

III. ANANIADÈS, B. (1934). Sur la nature gourmeuse de la paraplégie infectieuse du cheval. [**Connection between Strangles and Infectious Paraplegia in Horses**].—*Ibid.* 439-440. [3 refs.]

IV. VELU, H., ZOTTNER, G., & WEYLAND, H. (1935). Anémie et paraplégie infectieuses au Maroc : diagnostic différentiel. [**Differential Diagnosis of Equine Infectious Anaemia and Equine Infectious Paraplegia in Morocco**].—*Ibid.* **8.** 132-134. [5 refs.]

V. VELU, H., ZOTTNER, G., & WEYLAND, H. (1935). La paraplégie infectieuse du cheval est-elle toujours apyrétique ? [**The Absence of Fever in Equine Infectious Paraplegia**].—*Bull. Soc. Path. exot.* **28.** 70-74. 1 fig. [5 refs.]

I. This article is a record of experimental work on the elucidation of factors governing the dissemination of the virus of equine infectious paraplegia. The disease proved readily transmissible to healthy horses by subcutaneous injection of defibrinated virulent blood. Urine, vaginal discharge and faeces did not appear to contain virus, and attempts at transmission of the disease by use of these media failed when preparations of them were introduced *per os* and *per vaginam*. The author points out that these results are at variance with the accepted theories of transmission of the disease, both in regard to the portal of entry to the body and to the absence of virus in excretions. Nevertheless, he considers that the alimentary tract must be the normal route of infection, and that urine and other excrement are probably the normal infective agents through soiling by blood extravasations.

II. The subject matter of this article is clearly indicated in the title. The author records in detail the results of naked eye and microscopic examination of the heart, and nervous, urinary, digestive and respiratory systems of horses which died during an outbreak of infectious paraplegia at Athens. The changes found fell into two classes, viz., degenerative and congestive. The former showed

as areas of necrosis of nerve centres or fatty degeneration of the liver and kidneys. Congestion took the form of capillary engorgement and extravasations. He considers that these changes are the direct result of the operation of a highly toxic agent.

III. An outbreak of infectious paraplegia of horses in Greece in 1933 provided the author with an opportunity of following up his previous work on the role of the strangles streptococcus in this disease. He was able to isolate a streptococcus of the strangles type from the cerebrospinal fluid of the affected animals. Guinea pigs inoculated with cultures of this organism developed paraplegia and died.

IV. The authors refer to the difficulty experienced in Morocco in differentiating between equine infectious anaemia, protozoal infections and certain other diseases of the horse, and state that to these must now be added infectious paraplegia, a number of cases of which have been met with from time to time. They point out that symptoms of incoordination of movement are shown in many of these conditions, and that such cannot therefore be considered of much value in differential diagnosis. Further, in their experience, infectious paraplegia is not always an afebrile condition, nor are signs of general constitutional disturbance always lacking. They were able to demonstrate the typical streptococcus, commonly associated with infectious paraplegia, in three outbreaks of this disease, in all of which a tentative diagnosis of infectious anaemia had already been made. Laboratory assistance in differential diagnosis thus appears necessary.

V. In this paper the authors dispute the assertion that infectious paraplegia of the horse is always an afebrile condition. They report the results of observations made in Morocco on five cases. A rise of temperature was shown in the early stages of each of these. It proved transient. The authors suggest that the disease develops in two forms, viz. an apyretic form and a pyretic form, and point out that the latter adds further to the confusion already existing in the differential diagnosis of equine infectious anaemia.—C. Davenport.

Cuillé, J., & Chelle, P. (1935). L'ictère hémorragique du mouton. [**Haemorrhagic Icterus of Sheep**].—*Rev. vét., Toulouse.* **87.** 5-13. 2 figs. on 1 plate. [12 refs.]

Haemolytic jaundice of sheep is characterized by an intense coloration of the mucous membranes and skin, and the passage of dark-coloured urine. The disease appears in the autumn and two forms may be recognized. In the acute form, there is prostration, loss of appetite, arrest of rumination and sudden appearance of jaundice. The temperature remains about normal and never rises above 40°C. There is pronounced anaemia and death follows in two to three days. In the chronic form, the symptoms are similar, but not so severe, and they regress after eight to ten days. On *post-mortem* examination, in addition to the jaundice, the spleen is enlarged and the liver has a characteristic greyish-yellow colour.

The aetiology of the disease is obscure, but the authors have been able to show that, on the second day, small round granules appear at the periphery of the red blood corpuscles. These appear to be identical with anaplasms.

30 c.c. of blood from an infected animal, injected into a normal sheep, produced anaemia and the appearance of anaplasms in the red blood corpuscles ; jaundice, however, did not develop. Treatment is most unsatisfactory, but those animals which recover from an attack remain immune for life.—F. Blakemore.

Berge, E., & Cohrs, P. (1934). Mittelohrvereiterung und Facialislähmung beim Pferde. [**Suppuration of the Middle Ear and Facial Paralysis in a Horse**].—*Arch. wiss. prakt. Tierheilk.* **68.** 295-304. 4 figs. [8 refs.]

This is an addition to the small literature on middle ear disease of the horse. The authors describe six cases in detail. A three-year-old draught mare was brought in for treatment for left-sided facial paralysis and discharge from the ear. It was slaughtered and the head was examined in detail.

On careful dissection from below it was found that there was purulent inflammation in the middle ear, the tympanum being ruptured, and the external auditory meatus being inflamed and containing pus.

The histological picture is described and illustrated : the normal anatomy of the middle ear was completely changed, the swollen mucosa and pus filling the cavity, the inner ear and the auditory and facial nerves together with their bony canals being involved.—J. E.

FALASCHINI, A. (1934). Richerche sulla concentrazione idrogenionica del secreto vaginale delle bovine sterili. [**pH of Vaginal Secretion of Sterile Cows**].—*Clin. vet. Milano.* **57.** 898-900.

The author has compared the pH of the vaginal discharges from 30 healthy cows with those from 55 sterile cows known to be suffering from such conditions as ovarian cysts, persistent corpus luteum, salpingitis, vaginitis, cervicitis, etc. The samples were taken from the vagina by means of a sterile sponge, diluted with distilled water and examined colorimetrically. The discharges from normal cows and from cows having lesions in their ovaries were found to be neutral. The discharges from cows showing lesions in the uterus, cervix or vagina varied in pH between 6·2 and 6·9. It was observed that the more severe the lesion the more acid became the discharge.—J. A. NICHOLSON.

FURTH, J. (1934). **Observations on Fowl Paralysis. (Neurolymphomatosis).**—*Proc. Soc. exp. Biol., N.Y.* **31.** 921-923. 1 chart. [4 refs.] [Copied *verbatim* from *Exp. Sta. Rec.* **72.** 108-109.]

Two transmissible strains of fowl paralysis virus are reported to have been isolated, 15 successful passages having been made with one strain and 10 passages with the other. Inoculations were made in most instances by intravenous injections of blood from paralyzed chickens into healthy young chickens. The transmitting agent circulates in the blood of paralyzed chickens throughout the course of illness as shown by experiment.

" Neurolymphomatosis, unlike all known transmissible strains of leucosis of chickens, does not affect the bone marrow, rarely affects the liver and the spleen, and rarely causes conspicuous alteration in the number of circulating leucocytes. Occasionally the number of lymphocytes in the blood is increased. The highest leucocyte count observed was 140,000, and 92 per cent. of these cells were lymphocytes mostly of small size."

EMMEL, M. W. (1935). **The Etiology of Fowl Paralysis (Neuro-lymphomatosis gallinarium-Pappenheimer), Leucosis and Allied Conditions in the Fowl.**—*J. Amer. vet. med. Ass.* **86.** 419-423. [2 refs.]

The author, following investigations over a period of four years, claims that fowl paralysis and leucosis are the manifestations of a single aetiological agent and that he has been able to induce these conditions by means of certain members of the paratyphoid and typhoid groups of bacteria. Further, he has with these organisms been able to induce certain allied conditions associated with naturally occurring outbreaks of these diseases such as " going light " and sarcomatosis.

In a series of experiments it was determined that enteritis is a necessary predisposing factor in an outbreak of the disease in that it furnishes an avenue of infection for the primary aetiological agent. The causal organism establishing itself in the intestinal tract gains entrance to the blood stream by means of the inflamed intestinal mucosa.

The natural defences of the bird are called into action to destroy the invaders and this gives rise to haemocytoblastosis. Endotoxin, which is an important constituent of the groups of organisms acting as the primary aetiological agent, now becomes an important factor in the continuation of the process. The author states that the intravenous or intraperitoneal injection of such endotoxin into young chickens often causes typical but transient symptoms of paralysis.

Only in exceptional cases during the entrance of the causal organism into the blood stream can the organism be isolated from the tissues of the bird. The period of infection may be from five to 20 days and the causal organism then seems to disappear.

Haemocytoblastosis continues, apparently due to a new substance, a product of the disintegrating blood cells. This new substance is toxic to the blood cells ; as the destruction of blood cells continues, the bird attempts to compensate by the formation of new blood cells. The hypothesis is advanced that this substance is of such a chemical structure that the normal physiological processes of the body have difficulty in eliminating it. Whether the bird eventually shows symptoms of paralysis, leucosis or an allied condition, depends upon the manner in which the process of haemocytoblastosis continues under the stimulus of this newly formed substance. Apparently some birds possess the ability to eliminate this substance from the body.

The period of incubation is represented by this process of haemocytoblastosis, which is shorter in young birds than in older birds and may be from 20 to 250 days or even longer.

Salmonella typhi-murium (formerly *Bact. aertrycke* or *Bact. enteritidis* Breslau) has been found to be the most common causal agent in natural outbreaks of fowl paralysis and leucosis.

The author has induced cases of these diseases with *S. schottmülleri*, *S. enteritidis* (formerly *Bact. enteritidis* Gärtner), *S. cholerae-suis* and *S. typhi-murium*.—NORMAN DOBSON.

CHIDESTER, F. E., ASHWORTH, A. L., ASHWORTH, G. A., & WILES, I. A. (1934). **Leg Weakness in the Fowl, Induced by Antuitrin Injections, and the Prevention of Leg Weakness by Iodine Feeding.**—*Int. Clin.* September. pp. 63-72. [48 refs.] [Copied *verbatim* from *Nutr. Abstr. Rev.* **4.** 939. Signed E. MASON].

Of 14 young chickens injected intravenously with antuitrin (from pregnancy urine) 7 developed leg weakness. No case appeared in a similar group of chickens fed desiccated thyroid, in conjunction with vitavose, a wheat preparation. The authors discuss at some length the possible causes of rickets and their relation to thyroid function.

WILLMAN, J. P., ASDELL, S. A., & OLAFSON, P. (1934). **An Investigation of the Cause of the Stiff-Lamb Disease.**—*Bull. Cornell agric. Exp. Sta.* No. 603. pp. 20. 4 figs. on 2 plates, 4 tables. [15 refs.] [Copied *verbatim* from *Exp. Sta. Rec.* **72.** 106-107.]

In experiments conducted during 4 yr. with several lots of ewes of mixed breeding, details of which are presented in tabular form, it was shown that stiff lambs, an early account of which by Metzger and Hagan is noted above, can be produced under experimental conditions. This affection was recorded from Oregon in 1928, since which time it has been reported from Maryland, Michigan, Montana, Nevada, Ohio, Pennsylvania, and Wisconsin.

The authors have found that this condition

" can be produced when the ewes are fed a ration consisting of oats, barley, cull beans, and second-cutting alfalfa hay. This ration has been moderately and liberally fed to ewes that were confined to their pens until a few weeks after lambing, and has been liberally fed to ewes that were exercised throughout the winter and spring. No stiff lambs have been produced by ewes which were liberally or moderately fed a ration of oats, wheat bran, corn silage, and mixed hay. The results indicate that neither exercise for the ewes during the winter nor heavy feeding of concentrates is the chief causal factor. The kinds or combinations of feeds seem to have a great influence on the losses that result from the stiff-lamb disease. Creep feeding does not seem to be a factor in the production of the disease."

A list is given of 15 references to the literature.

MIDDELDORF, R. (1935). Rachitis, Osteomalazie, Lecksucht und andere Mangelkrankheiten ; ihre Behandlung mit " Ancora-F (R) ". **[Rickets, Osteomalacia, Pica and Other Deficiency Diseases : Treatment with " Ancora-F (R) "].**—*Berl. tierärztl. Wschr.* **51.** 33-36.

The author describes the treatment of several cows, cattle and calves suffering from various disorders such as rickets, osteomalacia, pica and other deficiency diseases, with a preparation which is called " ancora-F (R) ". This is really a mineral mixture in which iodine, sulphur, iron, calcium and phosphorus are included.—JAMES STEWART.

KRUPSKI, A. (1934). Phosphor- und Calciumbestimmungen als Hilfsmittel zur Diagnose der Osteomalazie und Rachitis des Rindes. **[Estimation of Ca and P in Diagnosis of Osteomalacia and Rickets in Cattle].**—*Verh. schweiz. naturf. Ges. 1934.* pp. 479-480. [2 refs.]

The Ca and P of the serum of 19 normal cattle, 38 suffering from various diseases and 10 with characteristic symptoms of rickets or osteomalacia were determined. The figures obtained for the normal animals were in agreement with those generally accepted, those for the calves being somewhat higher.

In all the diseases studied the Ca was within normal limits and only in a few cases was the P found to be lowered. In no case of rickets in calves or osteomalacia in older cattle was a fall in the Ca or P observed.—G. D. SHEARER.

KNOWLES, H. R., HART, E. B., & HALPIN, J. G. (1935). **The Relation of the Preen Gland to Rickets in the Domestic Fowl.**—*Poult. Sci.* **14.** 33-36. 3 tables. [5 refs.]

The experiments recorded show that when there is a sufficient supply of the antirachitic factor, either as ultra-violet irradiation or as cod liver oil, the preen gland has no influence on the occurrence of rickets in chicks, and is not essential for calcium metabolism. Chicks from which the preen gland had been removed, if placed on a suitable diet, grew as well as the controls and their skeletons showed a normal ash content.—R. F. GORDON.

KLINE, B. E., ELVEHJEM, C. A., & HALPIN, J. G. (1935). **The Effect of the Hen's Diet on the Bone Changes in Rachitic Chicks.**—*Poult. Sci.* **14.** 116-118. 2 tables. [5 refs.]

An increased storage of vitamin D in the chick at the time of hatching should result in a higher level of bone ash early in the life of the chick, the maintenance of which would depend upon the amount of vitamin D available. From the data given in this paper, the authors have shown that, within practical feeding limits at least, the level of vitamin D in the hen's ration does not affect the percentage of ash in the bones of the chicks hatched from eggs produced by these hens. Although the chicks showed a very low bone ash when two weeks old, there was

a significant difference between rachitic and non-rachitic chicks when four weeks old. This is of importance, as it would denote that the four week period is the best length of time for vitamin D assay work on chicks.—JAMES STEWART.

SJOLLEMA, B. (1935). **Tetany in Calves.**—*Vet. J.* **91.** 132-137. 1 fig., 1 table. [8 refs.]

The author has studied the mineral content of the blood in five cases of tetany in calves. He finds that the Mg value is subject to the greatest fluctuation, being sometimes high and sometimes low. Other workers have found the Mg value in the blood to be low and they have suggested that a Mg deficiency is the cause of the disease. The author cannot agree with this, however, and from his experiments on high protein feeding in cows he is inclined to the idea that the Mg disturbance is due to too much protein in the diet and suggests that, as soon as signs of tetany are observed, the animals should be put on a low protein ration.—G. D. S.

PUBLIC HEALTH.

ZIEGLER, M., & SCHULZE, W. (1935). Das Zellbild der Milch bei der tuberkulösen Mastitis. [**The Cell Picture of Milk in Tuberculous Mastitis**].—*Z. Fleisch- u. Milchhyg.* **45.** 5-10. 6 figs., 1 table. [5 refs.]

The authors describe the characteristic features of milk sediment in tuberculous mastitis, usually recognized by the presence of giant cells, epithelioid cell groups and mononuclear cells. Groups of epithelial cells may also be seen in smears of mastitis milk, but a differentiation can be made by their intense staining, which is in contrast to the defective staining of the nuclei of epithelioid cells. Of 120 milk samples which showed tubercle bacilli microscopically or by guinea pig inoculation, 73 showed the typical cell picture.—S. J. EDWARDS.

BARRATT, M. M. (1935). **Some Observations on the Isolation of Brucella Organisms from Raw Milk.**—*J. comp. Path.* **48.** 43-50. 2 tables. [24 refs.]

The author examined 157 samples of milk for *Br. abortus* by the guinea pig method and 34 were found to be infected. The milk samples were ordinary samples, single cow samples and graded milk. The only sample of certified milk examined was infected, but no brucella organisms were found in five samples of pasteurized milk. Cultures were prepared from local glands as well as spleen and this procedure is advocated, as in six of 29 guinea pigs cultures were obtained from the glands and not from the spleen. The sera of 42 guinea pigs were examined for brucella agglutinins and close agreement was found with the cultural results.

Of 36 total strains examined, nine were not CO_2-sensitive and this fact is discussed. They may be porcine or even *melitensis* strains, but this is considered unlikely, or they may be typical bovine strains used in living vaccines, and have acquired the property of growing in air. On the other hand, there is a suggestion that such strains may occur naturally in this country in a small proportion of cases, similar to those found regularly in Southern Rhodesia.—R. LOVELL.

STOCKMAYER, W. (1934). Ueber Bang-Bakterien in Milchprodukten. [*Brucella abortus* **in Milk Products**].—*Zlb. Bakt. I. (Ref.).* **116.** 332-334.

The milk products examined for the presence of *Br. abortus* were samples of cream, butter, milk, buttermilk, etc. A good sediment was obtained by centrifuging for half an hour at 3,000 R.P.M. and with cultures prepared on gentian violet-malachite green plates in a CO_2 atmosphere.

Br. abortus was demonstrated in all the milk products, and it is concluded that pasteurization will have to be resorted to if the public health is to be safeguarded.—D. J. ANTHONY.

DALRYMPLE-CHAMPNEYS, W. (1935). **Report on the Supervision of Milk Pasteurising Plants.**—*Rep. publ. Hlth med. Subj., Lond.* No. 77. pp. 47. 7 figs.

This report deals with the construction, operation and cleaning of pasteurizing plants, its purpose being to assist officers of local authorities in the examination and supervision of pasteurizing plants in accordance with the requirements of the Milk (Special Designations) Order 1923. As the bacterial standard is for a sample " taken after pasteurisation and before delivery to the consumer " the subjects of bottle washing, filling and capping are also included.

Discussing the objects of pasteurization, which are the destruction of pathogenic organisms and the postponement of souring, the author states that there is no doubt that pasteurization carried out in the manner required by the Order renders milk safe. Successful pasteurization is, however, dependent upon the cleanliness of the raw milk. Pasteurization cannot make dirty milk clean and pasteurized dirty milk is distinctly inferior in its keeping qualities to pasteurized clean milk.

Consideration is also paid to the construction of premises, and this is followed by a description of the component parts of pasteurizing plants in which the advantages and disadvantages of certain forms are discussed. The parts referred to include the tipping tank, milk pumps, heaters, filters, holders, temperature recorders, coolers, pipe lines and balancing tanks. The most important part of the plant is the holder, sometimes improperly called the " retarder ", and the author points out that the requirements of the Order can only be complied with by what is known as the " positive holding" method, in which the milk is actually held at the required temperature for the required time. As effective pasteurization is dependent upon the exact regulation of temperature, accurate automatic temperature recorders or at least reliable thermometers are essential, but this provision is frequently overlooked.

During operation, the apparatus should be under the constant, personal and detailed control of a responsible person as " the best plant ever constructed is no more fool proof than any other type of machinery and a small mistake in working, especially in the later stages, can easily spoil the whole result." Finally, efficient cleaning is essential. Indifferent cleaning usually results in subsequent inefficient pasteurization.

Short appendixes are added on (a) in-bottle pasteurization, (b) efficiency of small plants and (c) thermophilic and thermoduric organisms.—G. O. DAVIES.

—. (1935). **The Provision of a Safe Milk Supply.**—*Brit. med. J.* Feb. 16th. 309.

This leading article emphasizes the chief points made by the Cattle Diseases Committee of the Economic Advisory Council, viz., the eradication of bovine tuberculosis, the necessity for a veterinary service to control cattle disease, the recommendation that all milk sold for human consumption must attain a fixed standard of cleanliness and, finally, that power should be given to local authorities to enforce pasteurization. The National Association for the Prevention of Tuberculosis has in the main agreed to these findings ; it emphasizes the necessity for the production and distribution of milk on a basis uniform to the whole nation, and is of the opinion that such a condition must come about before the

general public should be urged to increase its *per capita* consumption. The Association supports a scheme of controlled pasteurization, which will remain until the eradication plan is well under way, and expresses the hope that an Exchequer grant will be forthcoming to assist the clean milk campaign.

—JOHN REID.

PIEN, J., & BAISSE, J. (1934). Le contrôle chimique de la pasteurisation basse. **[Chemical Control of Low Temperature Pasteurization].**—*Le Lait.* **14.** 934-942. [6 refs.]

The authors discuss the difficulties in arriving at a rapid method of ascertaining if milk has been pasteurized at a low temperature or not. They describe the ring method of Schern-Gorli, with washed red blood corpuscles of guinea pigs and their modifications, and also the methods of Kohn and Klemm, who used animal charcoal, carmine or indigo in suspension. These methods are only of use if milk has been heated above or below 60°C. (140°F.), or is raw.

The satisfactory pasteurization temperature is at least 65·5°C. (150°F.) for 20 minutes, and the authors have discovered a method of using synthetic indigo as a base whereby milk heated only up to 65°C. (149°F.) gives a positive ring reaction of blue cream, while milk heated to more than 67°C. (152°F.) gives a definite negative. Their method clearly distinguishes milk heated to above 66° to 67°C. (150° to 152°F.) for 20 minutes. The result is the same for milk heated to 75°C. (167°F.) for one minute or instantaneously to a higher temperature. Mixed pasteurized and raw milks can be distinguished by both a blue and a white line, but if the milk is adulterated up to 10 per cent. or more the method is of no avail.—D. S. RABAGLIATI.

DAVISON, W. C. (1935). **Elimination of Milk-Borne Disease.**—*Amer. J. Dis. Child.* **49.** 72-78. 3 tables. [59 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **10.** 336. Signed W. G. SAVAGE].

The author points out that between 1924 and 1932 (inclusive) there have been 394 recorded outbreaks of milk-borne acute infectious disease in U.S.A. (261 of these being typhoid fever) and that many outbreaks are unrecorded. In addition 1,407 cases of undulant fever in man were reported in U.S.A. in 1932. Tuberculosis from milk is now less frequent. Pasteurization is stressed but the author is particularly concerned with infant feeding and recommends lactic acid milk in such cases. He advocates lactic acid evaporated milk as the best artificial infant food. A suitable preparation can be made by diluting unsweetened evaporated whole milk with an equal amount of cooled, boiled water containing 1·5 per cent. of lactic acid and 15 per cent. of cane sugar or molasses. The mixture should be kept for 6 hours before being given to infants. The vitamins are destroyed so tomato or orange juice in addition is required.

SCOTT, W. M. (1935). **Biennial Reviews of the Progress of Dairy Science. Section F. Milk-Borne Diseases. I. Streptococcal Infections. II.** *Brucella* **Infections. III.** *Salmonella* **and Dysentery Infections. IV. Tuberculosis.** —*J. Dairy Res.* **6.** 103-112. [21 refs.]

As indicated in the title, this is a composite review, and attention is chiefly paid to those methods employed in identifying bacterial species which have greatly increased the assurance with which human infections can be ascribed to specific infection of cows or their milk.

The methods employed in isolation and differentiation of streptococci by cultural, biochemical and serological reactions are dealt with. Emphasis is laid

on the value of the splitting of sodium hippurate, the fermentation of trehalose and sorbite and the fibrinolytic tests as means of differentiation, coupled with the recent work of LANCEFIELD in group specificity [see this *Bull.* **4.** 199 and **5.** 58].

The brucella group is similarly dealt with, the importance being stressed of determining CO_2 sensitivity, H_2S formation, growth in presence of the various dyes and the reaction obtained with monospecific serum.

The general principles adopted in differentiating members of the salmonella group are well established and brief references only are given.

The technical procedures for the detection of tubercle bacilli in milk and milk products are also considered under the headings of direct microscopical examination, culture and animal inoculation.

The review is excellent and a valuable contribution to the subject of milk-borne diseases.—R. LOVELL.

—. (1934). **Abattoir Design. Report of Technical Committee.**—*Econ. Ser. Minist. Agric.* No. 40. pp. 46. 2 plans. London : H.M. Stat. Off. [8vo] [1s.]

The report deals with the principal characteristics of the factory abattoir, emphasizing the specialization of labour and the uniform condition and appearance of the finished dressed carcasses. Descriptions of the structure, layout and equipment required in the abattoir and lairages are given. For slaughter of cattle, it is recommended that an additional pen, suitable for the Jewish method, should be included in the abattoir. The hope is expressed that the electrical stunning device will be improved upon, so that it may be used on sheep as it is on pigs in many abattoirs in England at present. Suggestions are given for dealing with all the by-products of the various animals slaughtered. In the summary, it is recommended that the factory abattoir should have three main floors, in order to work on factory lines. As soon as the carcass is dressed, it should be placed in the pre-cooler until the following morning and then passed into the cooler – this arrangement preserves the bloom – the cooler being kept at a temperature of from 38° to 40°F. In Appendix A a description is given of the cooling, the pre-cooler and cooler system being desirable for the following reasons :– (a) to secure uniform production ; (b) to avoid any risk of bone taint in hot weather or when humidity is high, and (c) to minimize shrinkage losses.

Appendix B shows the spaces required by by-products for factory abattoirs handling average daily kills. Accompanying the report are two diagrams showing the layout of the factory abattoir, which give a clear idea of the plans as recommended in the report.—BRENNAN DE VINE.

OOMS, A. A. J. (1934). Bijdrage tot de aetiologie der vleeschvergiftigingen. [**Aetiology of Meat Poisoning**].—*Thesis, Utrecht.* pp. 99. 1 fig. [76 refs.] [An abbreviated version appears in *Tijdschr. Diergeneesk.* **61.** 1289-1296. (English, French and German summaries)].

Most cases of meat poisoning are caused by meat which has been contaminated during life. In Holland, infections of slaughter cattle by *Salmonella enteritidis* (formerly *Bact. enteritidis* Gärtner) are frequently observed. Therefore in cases of meat poisoning in man, it is suggested that the cattle on the farm from which the infected animal came should be inspected. Salmonella multiply and penetrate more quickly in alkaline meat than in acid meat. Experiments with mice which were fed with contaminated meat did not demonstrate any difference between the pathogenic power of alkali or acid-reacting meat. In meat control, determination of the real acidity of the meat may act as a preliminary indication, but it cannot be a substitute for bacteriological examination.—J. VAN DER HOEDEN (UTRECHT).

FROMME. (1934). Nahrungsmittelvergiftungen nach Genuss von Rührei aus Enteneiern. [**Food Poisoning from Scrambled (Duck's) Eggs**].—*Dtsch. med. Wschr.* **60.** 1969-1970. [8 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **10.** 267-268. Signed W. G. SAVAGE.]

After discussing the literature the author gives details of another food poisoning outbreak in 1934 affecting 4 persons in one family – father, mother and two children. The vehicle was scrambled ducks' eggs eaten for breakfast. From the stools the enteritidis-Breslau bacillus (*Bact. aertrycke*) was isolated. The source of the eggs was traced and from 15 eggs the same bacillus was isolated from the interior in 2 cases, one in pure culture, the other mixed with *Bact. coli*. The ducks were 20 in number and of the *Khaki-Campbell* strain. The serum of all 20 was examined and in 9 positive agglutination (titre 1 : 100 to 1 : 1,400) against the Breslau bacillus was obtained. Their excreta was repeatedly examined and from 3 ducks this bacillus was isolated. Further eggs were examined and two more contained the bacillus. In all 166 ducks' eggs were investigated and in 4 eggs the bacillus was found in the interior and in 3 cases from the outer shell, a positive percentage of four. The author points out that the facts show evidence of infection within the oviduct of the ducks.

SERGENT, Ed., & SERGENT, Et. (1934). **Fly-free Manure Heaps.**—*Quart. Bull. Hlth Org. L. o. N.* **3.** 299-303. 2 figs. [Copied *verbatim* from *Bull. Hyg., Lond.* **10.** 132. Signed P. A. BUXTON.]

The authors discuss methods of dealing with stable manure so that the breeding of flies in it may be reduced or abolished. They consider the urban and rural problems separately.

Success in dealing with stable manure in the town of Algiers dates back to 1912, when two reinforced concrete containers were erected. Each was fly-proof and approximately air-tight, and so made that it could be loaded from above and discharged from the bottom of the side into a cart or lorry which was backed underneath it. Loading with fresh manure was carried out twice daily, the fermentation in the closed space engendering very great heat, a maximum of 94°C. being observed. The manure was kept in this closed space until it had fermented and ceased to be attractive to flies, and the two containers were used alternately, each one for 10-15 days.

The needs of the farmer are best met by methods which are now familiar. The manure is stacked on a concrete platform in the open as compactly as possible, and it is kept wet so that it is unattractive to the larvae when they are looking for a place for pupation. They therefore migrate from it at night, and fall into a gutter trap which completely surrounds the platform. These platforms are made in pairs and used alternately.

THERAPEUTICS.

I. YORKE, W., & MURGATROYD, F. (1935). **Biological Problems in Chemotherapy.**—*Trans. R. Soc. trop. Med. Hyg.* **28.** 435-468. 6 tables, 4 graphs. [32 refs.]

II. YORKE, W., & MURGATROYD, F. (1935). **Biological Problems in Chemotherapy.**—*Lancet.* **228.** 191-193.

I. An account of work done during the past seven years on drugs used in the treatment of trypanosomiasis.

In vitro PROPERTIES.—Aromatic pentavalent arsenical and antimonial compounds are but slightly trypanocidal, but the corresponding trivalent compounds

are amazingly so, as also are non-aromatic trivalent compounds. Acriflavine is highly trypanocidal. " Bayer 205 " resembles pentavalent compounds.

In vivo PROPERTIES.—Compounds most active *in vitro* are likewise most active *in vivo*. " Bayer 205," however, although inactive *in vitro* is just as active as trivalent compounds *in vivo*.

DRUG RESISTANCE.—A number of resistant trypanosome strains were prepared and the resistant qualities examined. A strain rendered resistant to one of the aromatic compounds of arsenic or antimony is also resistant to all other commonly used compounds of these metals and also to acriflavine, but is not resistant to tartar emetic or " Bayer 205 ". A strain which has become resistant to " Bayer 205 " is resistant to that drug alone. Attempts to render a normal strain resistant to tartar emetic failed, but a strain already resistant to " atoxyl " could then be made resistant to tartar emetic.

The authors believe that the development of a resistant strain is fundamentally due to a process of mutation. The resistance of their " atoxyl "-fast strain has remained unchanged over a period of five years.

Proof was obtained that resistant strains are being produced during the treatment of trypanosomiasis. Three strains from untreated cases in Tanganyika were found to be definitely resistant to arsenicals. Other experiments indicated that the size, number and spacing of the doses are important in the production of resistant strains ; that arsenobenzol compounds and aromatic trivalent arsenicals produced almost immediate sterilization of the peripheral circulation, but were of little value in the treatment of infected rabbits, while the corresponding pentavalent compounds produced peripheral sterilization only after a lapse of some hours, but resulted in a definite cure in a large number of cases.

It was also shown that rapid diffusion of certain drugs into red blood cells takes place, and that haemoglobin reduces pentavalent compounds to trivalent ones.

II. This is the same material as I. somewhat condensed in form.—W. J. I.

YORKE, W. (1934). Die Probleme der Arzneifestigkeit. **[The Problem of Drug-Fastness]**.—*Arch. Schiffs- u. Tropenhyg.* **38.** 55-66. 5 tables.

From experiments on the value of various trypanocidal drugs *in vitro* and *in vivo* the author concludes that, with the exception of " germanin ", it is unnecessary to assume that a complicated working of the host organism is involved. Resistant strains of *Tryp. rhodesiense* were established to " atoxyl ", " tryparsamide ", " halarsol ", " novarsenobillon ", " stibenyl ", " trypaflavine ", " germanin " and tartar emetic, and it was found that strains which were resistant to one of the aromatic arsenical or antimony compounds were also resistant to the others, whilst they did not show any increased resistance to " germanin " or emetic. Resistance to " germanin " was not associated with resistance to the other drugs, and resistance to tartar emetic could only be produced by previous treatment of the strain with " atoxyl ". That drug-fastness is a property of the trypanosome strain is shown by the persistence of this property on transference to a new host, e.g., mouse to rat or rabbit, and its survival even after cyclical passage through *Glossinae*.

The property of fastness seems to depend upon some form of impermeability, since, if susceptible trypanosomes are treated with arsenical solution and then removed, some of the arsenic is lost, whilst if arsenic-fast trypanosomes are treated similarly, no arsenic is removed from the solution.

The fact that arsenic-fastness is efficacious against all aromatic arsenicals and antimonials gives great importance to the possibility of creating drug-fast strains by treatment of the infected hosts, and experiments showed that such

strains could be easily produced by subcurative doses of arsenicals in rabbits, in which animals the course of a *T. rhodesiense* infection closely resembles that of human sleeping sickness.—U. F. RICHARDSON.

KROO, H. (1934). Studien über Immunität und Chemotherapie bei neugeborenen und erwachsenen Tieren. Untersuchungen über Spirochäteninfektion der Hühner. [**Studies on Immunity and Chemotherapy in New-Born and Adult Animals. Spirochaetal Infection in Fowls**].—*Z. ImmunForsch.* **84.** 1-14. 8 tables. [5 refs.]

This article records experiments on the immunity to infection with *Spirochaeta gallinarum* in adult fowls and day-old chicks. Chickens infected when one day old exhibited a more protracted infection than adult birds (16 days against 3 to 5 days), and the injection of dead spirochaetes failed to confer immunity on them. Whilst treatment with arsenobenzol effected a complete cure in adults, relapses occurred in young chickens, the relapse strain being immunologically identical with the infecting strain. Spirochaete suspension, when mixed with the sera of recovered adult fowls, failed to produce infection, but the sera of recovered chickens did not possess this property. In spite of the apparent failure of young chicks to produce any spirochaetocidal antibodies, recovered chickens resisted attempts at reinfection and it is concluded that the development of their immunity is a different process to the development of immunity in adult fowls.—U. F. R.

VELU, ZOTTNER, & MONOD, R. T. (1934). La chimioprévention de la dourine par le naganol à doses faibles et répétées. [**Prophylaxis against Dourine by the Injection of " Naganol " in Small Repeated Doses**].—*Bull. Acad. vét. Fr.* **7.** 133-134. [2 refs.]

This is a short report on further experiments on dourine prophylaxis. Following up their previous work on this subject [this *Bull.* **5.** 375.] the authors attempted to obtain the same degree and duration of protection as formerly, with smaller and safer doses of " naganol ", viz. 1 g. for a small horse. Three experiments only were carried out and these are recorded in detail. The results were favourable. —C. DAVENPORT.

YAKIMOFF, W. L., BABITZKY, E. S., SWIRSKY, S. A., & WEINTRAUB, A. M. (1935). Zur Frage der Behandlung der Rinderbabesiellosis mit " Albargin ". [**The Treatment of Bovine Piroplasmosis with "Albargin "**].—*Berl. tierärztl. Wschr.* **51.** 130-133. 7 tables. [1 ref.]

This article records experiments on the use of " albargin ", an organic silver preparation containing approximately 18 per cent. of silver, in the treatment of *Babesia bovis* infection in cattle. 167 infected cattle were treated and kept under observation, and 1,118 animals were treated in the field. It was ascertained by experiment that a dose of 2 to 2·3 g., given intravenously in a 2 per cent. or weaker solution, was safe, the toxicity largely depending on the dilution. The mortality after treatment was 6·1 per cent. against 6·3 per cent. in animals treated with " ichthargan ". In 74 per cent. of treated animals, the temperature fell to normal within 24 hours, and the parasites disappeared from the blood in all animals within the same period. Relapses occurred in 1·3 per cent. of cases.—U. F. RICHARDSON.

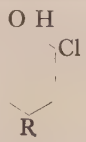
LOGÉ, G., & GUILHON, J. (1935). Traitement de la piroplasmose équine vraie par la gonacrine. [**Treatment of Equine Piroplasmosis with " Gonacrine "**]. —*Bull. Acad. vét. Fr.* **8.** 172-177. [1 ref.]

This is a report on the treatment of five cases of *Babesia caballi* infection in

the horse with " gonacrine " (chlorhydrate of diamino-acridine). The drug was administered intravenously in doses of 20 c.c. of a 5 per cent. solution. No ill effects followed its use. The injections brought about rapid improvement in the condition of the animals, a return of the temperature to normal within 48 hours and a very marked reduction in the incidence of intracorpuscular parasites. Repetition of dosage did not prove necessary. The authors consider that the drug has numerous advantages over trypan blue, including a higher parasiticidal value against this piroplasm.—C. DAVENPORT.

KLARMANN, E., SHTERNOV, V. A., & GATES, L. W. (1934). **The Bactericidal and Fungicidal Action of Homologous Halogen Phenol Derivatives and its " Quasi-Specific " Character. II. Derivatives of Orthochlorophenol (with Notes on Chlorine-Free Alkyl Phenol Derivatives).**—*J. Lab. clin. Med.* **20.** 40-47. 2 figs. [Copied *verbatim* from *Bull. Hyg., Lond.* **10.** 327. Signed G. S. WILSON].

The derivatives of orthochlorophenol are represented by the general formula,



where R is an aliphatic or aromatic substituent. Studies of the germicidal activity of the para-alkyl derivatives of orthochlorophenol were undertaken on a number of different organisms. The maximum activity against the coli-typhoid-dysentery group of organisms was possessed by n-butyl derivatives, while against Gram-positive and Gram-negative cocci and acid-fast bacilli compounds of higher molecular weight, particularly n-amyl and n-hexyl derivatives, were most active. Aromatic derivatives, such as 4-benzyl and 6-benzyl orthochlorophenol, were generally less potent than the most active of the para-alkyl derivatives.

Comparative observations indicated that the orthochlorophenol derivatives were about twice as active as the chlorine-free para-alkyl phenols. They were also very much less toxic, as judged by subcutaneous inoculation of mice.

JENSEN, Elsa. (1935). Einige Bemerkungen über das Verhalten einiger Farbstoffe der Deckglasmethode gegenüber. [**Bactericidal Tests of Dyes by the Cover Glass Method**].—*Acta path. microbiol. scand.* **12.** 216-231. 7 tables. [8 refs.] [In German].

Using the cover-slip method [see this *Bull.* **4.** 676.] to determine the disinfectant value of dyes, the author found that " entozon ", fuchsin, methylene blue, pyronin and trypan blue in a concentration of 1 : 100 failed to inhibit the growth of *Micrococcus aureus*. Clear-cut results were difficult to obtain with such dyes as brilliant green, malachite green, methyl violet, etc., since in some cases the dye required at least 24 hours to act and, in other cases, in spite of repeated washing with distilled water, much of the dye was carried over into the broth subcultures. Subcultivation in broth was also unsatisfactory since, although no growth was apparent after 30 days, growth occasionally appeared on the inoculation of agar slopes. It is probable that the dyes penetrate the bacteria, thus inhibiting their growth, but they diffuse out into the broth and growth occurs. The author concludes that the cover-slip method cannot be used to confirm the bactericidal action of dyes.—J. A. NICHOLSON.

I. Dudley, H. W., & Moir, C. (1935). **The Substance responsible for the Traditional Clinical Effect of Ergot.** [**Ergometrine**].—*Brit. med. J.* March 16th. 520-523. 2 figs. [4 refs.]

II. —. (1935). **Ergometrine: a Chemico-Clinical Discovery.**—*Ibid.* 532-533. [1 ref.]

I. A description of the method employed to extract a new alkaloid, named by the authors " ergometrine ", from ergot powder. Tested by peroral administration on the human puerperal uterus, it proved to be as active as the liquid extract of ergot and much more active than either of the four alkaloids isolated in the past.

A pharmacological study of " ergometrine " is being made.

II. An annotation on historical lines.—J. E.

Brandt, W. (1934). Ueber die Wirkung von Kupfer auf Eingeweidewürmer. [**The Action of Copper on Intestinal Worms**].—*Med. Klinik.* **30.** 1399-1400. 1 fig. [5 refs.] [Copied *verbatim* from *Helminth. Abstr.* **3.** 112. Signed R. H. H.]

From experiments *in vitro* Brandt shows that " Cupronat ", in suitable amounts, acts upon the smooth muscle cells of intestinal worms, causing paralysis and precluding the possibility of migration. For this reason, and because it is not toxic to man, Brandt suggests that Cupronat would be better than Santonin as an anthelmintic for expelling ascarids and other intestinal worms.

Lamson, P. D., Brown, H. W., & Ward, C. B. (1935). **Anthelmintic Studies on Alkyl-Hydroxybenzenes. I. Alkylpolyhydroxybenzenes.**—*J. Pharmacol.* **53.** 198-217. 1 fig., 6 tables. [50 refs.]

Lamson, P. D., Brown, H. W., Stoughton, R. W., Harwood, P. D., Baltzly, R., & Bass, A. (1935). **Anthelmintic Studies of Alkyl-Hydroxybenzenes. II. Ortho- and Para-N-Alkylphenols.**—*Ibid.* 218-226. 6 tables. [13 refs.]

Lamson, P. D., & Brown, H. W. (1935). **Anthelmintic Studies on Alkyl-Hydroxybenzenes. III. 6-N-Alkyl-Meta-Cresols.**—*Ibid.* 227-233. 7 tables. [7 refs.]

Lamson, P. D., Brown, H. W., Stoughton, R. W., Harwood, P. D., Baltzly, R., & Bass, A. (1935). **Anthelmintic Studies on Alkyl-Hydroxybenzenes. IV. Isomerism in Polyalkylphenols.**—*Ibid.* 234-238. 2 tables. [4 refs.]

Lamson, P. D., Brown, H. W., Stoughton, R. W., Harwood, P. D., Baltzly, R., & Bass, A. D. (1935). **Anthelmintic Studies on Alkyl-Hydroxybenzenes. V. Phenols with Other than Normal Alkyl Side Chains.**—*Ibid.* 239-249. 1 fig., 3 tables. [12 refs.]

The authors of these five reports have set out to find a new, safe and effective ascaricide. Hexylresorcinol, while extremely efficient and safe, is irritating to mucous membranes, and on this account the work has been directed towards the discovery of some alkylresorcinol or alkylphenol which, while having the same ascaricidal properties as hexylresorcinol, is less irritating. Several series of alkylphenols were tried during the course of the work, on worms *in vitro*, and on infested dogs and cats, but no substance was found, however, which had a greater anthelmintic action than hexylresorcinol, and it appeared that the phenolic type of ascaricidal activity is related to local irritant action – phenols lacking in this property seeming to lose their ascaricidal effect. On the other hand, all phenols which are locally irritating are not necessarily active ascaricides. The best ascaricidal action appears to combine with phenols which will liquefy or emulsify in the intestine and

which have a melting point not higher than 75°C. and a solubility ranging between 1 : 1,000 and 1 : 35,000 in water. The *in vitro* tests which, admittedly, are not thoroughly reliable, indicated that some of the alkylphenols with other than normal alkyl side chains, such as p-tertiary-butylphenol and p-tertiary-amylphenol, show decided ascaricidal properties, and should receive further trials.—E. L. T.

GRAF, H. (1934). Ueber die Art der Kohlewirkung bei ihrer medizinischen Anwendung. **[The Mode of Action of Medicinal Charcoal].**—*Tierärztl. Rdsch.* **40.** 526-529. 3 figs. [19 refs.]

In order that the reader may more readily follow the author's arguments with regard to the action of charcoal in the tissues, Graf introduces the subject with a detailed discussion of the theory of the relationship of invader to tissue. A toxin or a bacterial invader is influenced by the chemical nature of the medium in which it finds itself, and the response of the tissues varies according to the nature of the invader and the intensity and duration of the attack. The reaction of the tissues persists only so long as the stimulus is present, and increases in intensity up to a maximum which represents the point of death. The foregoing argument is illustrated graphically. The object of prophylaxis should be to interrupt the continuity of the stimulus by " distracting the toxin " from the cell and fixing it. This is what the carbon molecule does by adsorbing the toxin and preventing it from injuring the cell.

A number of substances which exist in a similar fine state of division, such as certain clays and infusorial earth, possess this quality to a variable degree. When carbon is injected into the abdominal cavity it does not act as a foreign body calling forth local response, but is carried by leucocytes to the spleen and liver, where it is to be found in the reticulo-endothelial tissue.

Charcoal therapy has proved efficacious in a number of conditions, particularly staphylococcal and streptococcal affections, when it can be applied locally.

—N. S. BARRON.

GREENWOOD, D. A., HEWITT, E. A., & NELSON, V. E. (1935). **The Effects of Fluorine on Respiration, Blood Pressure, Coagulation, and Blood Calcium and Phosphorus in the Dog.**—*J. Amer. vet. med. Ass.* **86.** 28-42. 5 figs., 3 tables. [22 refs.]

Since fluorine is present in many phosphatic mineral supplements fed to farm animals and in the drinking water in various countries, it has become of importance to ascertain the physiological effect of this element on the animal organism. While other authors have investigated several aspects of this problem, this paper deals with several effects of fluorine which so far have escaped attention. The dog was the only animal used throughout the experiments described. Sodium fluoride injected intravenously at levels of from 1·5 to 5·3 mg. per kg. body weight caused a detectable effect on the respiration, but it was necessary to increase injections to levels of 16 to 37 mg. before any lowering of the blood pressure was observed. Oral administration of 0·45 to 4·5 mg. of fluorine per kg. body weight caused no effect on total calcium, acid-soluble inorganic phosphorus, haemoglobin or coagulation-time of blood. No changes in the bones of dogs receiving daily 4·52 mg. of fluorine orally could be shown by X-ray photographs. The mottled enamel effect of the teeth, which has often been reported in man after drinking excessive fluorine in water, was observed in the case of the permanent, but not of the deciduous, teeth of dogs given water containing fluorides.

—JAMES STEWART.

DALE, H. (1935). **Pharmacology and Nerve-Endings.**—*Proc. R. Soc. Med.* **28.** 319-332. [35 refs.]

This is the first Dixon memorial lecture to be delivered, and the lecturer has chosen to deal with a definite aspect of Prof. DIXON's work rather than attempt a systematic review of his contributions to science. A study of the physiology and pharmacology of the bronchioles and pulmonary vessels aroused DIXON's interest in the action of alkaloids and organic bases which reproduce the effects of autonomic nerves. From this work the suggestion arose that autonomic nerves transmit their effects by releasing at their endings specific substances which reproduce their actions. In time, it was established that parasympathetic effects are produced by the release of acetyl-choline and sympathetic effects by adrenaline. Recent work has indicated that the action of these substances must be on the effector cells and not on the nerve endings, and that they are not newly formed as each nerve impulse arrives, but are held in some inactivating and protective complex from which the impulse releases them.—J. A. NICHOLSON.

EIDINOW, A. (1935). **Photo-Dynamic Sensitization: Biological Action and Therapeutical Application.**—*Proc. R. Soc. Med.* **28.** 633-640. [9 refs.]

Photodynamic sensitization may be defined as the mechanism by which the chemical composition of living cells may be altered following their exposure to rays of light, which normally in themselves have no specific chemical or biological action. Photodynamic sensitization has been reported as the cause of several diseases of animals. In the case of domestic animals, the skin lesions and light sickness are mainly due to exogenous causes, owing to the absorption of chemical substances which are light sensitizers. Sensitization diseases of animals are only found in white animals, being most uncommon in black animals. A good example of this is buck-wheat poisoning of sheep, pigs, cows and horses, supposed to be due to the photodynamic substance phyloporphyrin. Clover sickness, seen in white horses fed on Swedish clover, is a disease where the non-pigmented areas of the skin of the head, joints and mouth show reddening and oedema on exposure to bright sunlight. White sheep, but not black, which have eaten hay largely composed of *Hypericum crispum* become very ill during bright sunny days, when their wool falls out and necrosis of the skin develops. In Florida, it is said that only black pigs are reared, as white pigs become ill and die owing to the feeding of the pigmented root of lachnanth-madder.—JAMES STEWART.

BISHOP, P. M. F., COOK, F., & HAMPSON, A. C. (1935). **Indications for the Clinical Use of Progestin, Standardised Corpus Luteum Extract.**—*Lancet.* **228.** 139-142. 5 figs.

Progestin inhibits the spontaneous activity of the uterine muscle so that its excretion by the ovary ensures an ideal state for the development of the fertilized ovum in the uterine cavity. If the corpus luteum degenerates early in pregnancy, the quiescent state of the uterus is lost and abortion usually follows. Cases may occur in which the pituitary has failed to produce sufficient secretion to stimulate ovulation. Here the follicles continue to grow and become cystic and, although the indications are for the administration of anterior pituitary preparations, progestin, by antagonizing the oestrin effect, is also of value. In cases where the ovary has failed to secrete sufficient oestrin or progestin, the uterus remains infantile and the indications are for large doses of oestrin followed by progestin.
—J. A. NICHOLSON.

SZEPESHELYI, A. (1934). A méhösszehúzódások fokozása tehenekben a Temesváry-féle thymophysinnel. [**Research on Temesváry's Thymophysin as a Uterine Stimulant**].—*Allatorv. Lapok.* **57.** 45-48. 4 charts. [11 refs.] [Abst. from transl. of Hungarian summary].

The author gives the results of biological tests of " thymophysin ", a thymus-pituitary preparation, on the puerperal bovine uterus.

" Thymophysin " is a useful ecbolic and may be administered intravenously, subcutaneously, epidurally or intramuscularly.—J. E.

—. (1935). **Biological Effects of Thymus Extracts.**—*Brit. med. J.* May 11th. 983. [1 ref.]

It has long been known that the thymus gland develops during growth and undergoes involution at puberty, but attempts to elucidate the exact effects which it produces in the body have led to conflicting results. Recently, however, extraction of the gland by means of a warm 0·5 per cent. HCl solution has yielded a fluid, 1 c.c. of which, on intraperitoneal injection into young rats daily until maturity for a number of generations, produces a remarkable acceleration in the growth and development of the young of these animals, especially in the fifth generation. If the use of the extract is stopped for one generation the effect disappears.

—J. A. NICHOLSON.

BRUNSCHWICK, M. (1934). Essai de mise au point de traitement de l'hémoglobinurie paroxystique du cheval par les injections du sang bovin. [**Treatment of Myoglobinuria Paralytica with Bovine Blood**].—*Rec. Méd. vét.* **110.** 727-729. [1 ref.]

This is a further report on the treatment of equine myoglobinuria with normal bovine blood [see this *Bull.* **4.** 667]. Four horses died from shock, apparently due to the blood injection, and eight recovered. There is still much to study in this mode of treatment, the physiological condition of the bovine blood donor being believed to be important.—J. E.

STAFSETH, H. J., & CAMARGO, F. (1935). **On the Disinfection of Poultry-Houses by means of Fire-Guns.**—*J. Amer. vet. med. Ass.* **86.** 162-167. 3 tables. [1 ref.]

Four experiments were carried out and in each the efficiency of the fire-gun was checked by bacteriological examination : in each case careful cleaning preceded the use of the fire-gun. The first experiment was on areas of a concrete floor, the second and third on floors provided with " dropping boards ". In the fourth experiment areas of a concrete floor were lightly smeared with droppings artificially infected with *Salmonella pullorum.*

The experiments showed that *Bact. coli*, staphylococci, streptococci and *S. pullorum* survive an exposure of 15 seconds, and the authors conclude that disinfection of poultry houses by fire in this manner is impracticable and very inefficient.—W. J. IRONSIDE.

VECTEN, & COSSON. (1935). Note sur un essai de traitement des plaies du cheval par les larves et les extraits de larves de Lucilia Sericata. [**Treatment of Wounds of Horses with Maggots**].—*Rev. vét. milit.* **19.** 83-88. 2 figs. on 1 plate.

This is a detailed account of the treatment of a severe wound of the leg in a horse with larvae and extracts of larvae of *Lucilia sericata.* A complete and easy cure was effected. The wound had previously failed to respond to ordinary lines

of treatment. There is a note on references in literature and the observations of other workers regarding the beneficial action of maggots in wounds.—C. D.

POISONS AND POISONING.

MICHNEVITCH, P. V. (1934). **Poisoning of Swine by Sodium Chloride.**—*Sovyet. Vet.* No. 11. pp. 68-71. [Abst. from French summary].

Administration of salt to swine *ad lib.* may cause poisoning. Symptoms of lesions in the central nervous system are shown, and the temperature rises to 40° to 40·5°C. and does not fall until death. Autopsy shows a generalized hyperaemia. The kidneys are enlarged, deep red, the capsule adherent and arteries and veins congested. The bladder is distended and the mucous membrane hyperaemic. The ultimate cause of death is asphyxia.—C. V. WATKINS.

STEYN, D. G. (1933). **Recent Investigations into the Toxicity of Known and Unknown Poisonous Plants in the Union of South Africa.**—*Onderstepoort J. vet. Sci.* **1.** 173-182.

This is an account of feeding trials with 27 plant specimens of which the following were found to be poisonous :—*Psilocaulon absimile* N.E.Br., *Adromischus umbraticolus* C.A.Sm., *Equisetum ramossissimum* Desf., *Chironia transvaalensis* Gilg., *Scilla* sp. and *Ornithoglossum glaucum* Salisb.—G. D. SHEARER.

STEYN, D. G. (1934). **The Toxicology of Plants in South Africa.**—*Onderstepoort J. vet. Sci.* **3.** 359-473. 11 figs., 6 tables. [5½ pp. refs.]

This article deals in a very comprehensive manner with the subject of poisoning in domesticated animals, associated with plants containing toxic principles. The author discusses the subject under the following headings :—(1) definition of poisonous plants ; (2) classification of poisons ; (3) access of poisons to the animal body ; (4) the fate of poisons in the body ; (5) modes of action of poisonous plants ; (6) the toxic principles and their physiological significance ; (7) detection of poisonous plants and their active ingredients in the body ; (8) diagnosis of plant poisoning ; (9) prognosis of plant poisoning ; (10) general principles of treatment of plant poisoning ; (11) factors influencing the toxicity of plants ; (12) conditions giving rise to accidental ingestion of poisonous plants ; (13) prevention of plant poisoning ; (14) eradication of poisonous plants, and several other headings.

The author describes his methods of determining the toxicity of plants. The last portion of the article is devoted to a discussion of the special toxicology of certain plants such as those, including some valuable feeding grasses, which may develop hydrocyanic acid under certain climatic and soil conditions. An investigation is described of a disease in kids and lambs known as " kaalsiekte ", an alopecia due to the ingestion of a plant *Chrysocoma tenuifolia* (" bitter bossie "). The toxic principle is excreted in the milk of lactating animals which have been feeding on the plant and it is from the milk that the young animals become affected.

—E. M. ROBINSON.

SIMONNET, H. (1935). Quelques réflexions sur les intoxications ayant pour origine les aliments végétaux. [**Plant Poisoning**].—*Rec. Méd. vét.* **111.** 193-196. [3 refs.]

The author deals with poisoning in animals caused by plants closely resembling in appearance those used as foodstuffs, and also plants commonly used as foodstuffs which may, under certain conditions, develop toxic properties. He draws attention to the fact that poisonous symptoms may be exhibited some time after the ingestion of the plant.

Plants containing cyanogenetic glucosides may, under certain conditions, be

capable of generating sufficient HCN to cause death in animals. This is probably the reason why certain of the Gramineae suddenly become poisonous, as is also the case with those plants capable of elaborating oil of mustard.

He advocates the introduction into pastures of plants known to increase milk production and also the addition of plants known to be stomachics and eupeptics to the food of animals receiving a bulky diet.—G. D. SHEARER.

JOURAVELEFF, M. S. (1934). **Plant Poisoning.**—*Sovyet. Vet.* No. 11. pp. 60-63. [Abst. from French summary].

All plants of the family Euphorbiaceae found in the U.S.S.R. (more than 60) are more or less poisonous. Since the chief toxic principle is an acute irritant, slight salivation may be set up, and an enteritis with a brown diarrhoea and blood and mucus in the faeces. If the animal survives, there is atony of the rumen, with a weak heart and pulse. Acute cases show a sideways " S " bending of the neck. At autopsy there is blood extravasation in the first three stomachs. In chronic cases the abomasal contents are very dry. There is catarrhal abomasitis with varying haemorrhagic lesions, and a catarrhal and haemorrhagic enteritis. The gall-bladder is distended, and its mucous membrane haemorrhagic. The upper borders of the lungs are oedematous, and the lower borders emphysematous. —C. V. WATKINS.

QUIN, J. I. (1935). **Photosensitization.**—*S. Afr. med. J.* **9.** 30.

The author discusses the two types of photosensitizing substances, the exogenous and the endogenous. To the former class belong the fluorescent dye stuffs, the quinine salts, haematoporphyrin and photosensitizing pigments in certain plants ; to the latter class belong substances such as uroporphyrin and coproporphyrin. The symptoms provoked by all these substances are very similar. The type of photosensitization in sheep known locally as " geeldikkop " is described and its association with phylloerythrin, a fluorescent pigment derived from chlorophyll, is mentioned.—E. M. ROBINSON.

RIMINGTON, C., & QUIN, J. J. (1934). Das Vorkommen eines Methämoglobinämie erzeugenden Prinzips bei einigen Arten der Pflanzenfamilie Tribulus. [**A Substance Occurring in *Tribulus* Plants which Produces Methaemoglobinaemia (in Sheep)**].—*Biochem. Z.* **269.** 4-13. 2 tables. [13 refs.]

The substance in *Tribulus* plants which produces methaemoglobinaemia in sheep has been proved to be an inorganic nitrite, probably KNO_2. This compound is not present in the whole, fresh plant, but can be demonstrated after maceration with water and standing for some time. Potassium nitrate is, however, present in the fresh plant and was isolated in a pure state. An enzyme was also prepared from the plant capable of reducing KNO_3 to KNO_2. Potassium nitrite produces methaemoglobinaemia in sheep, which is one of the characteristic findings in *Tribulus* poisoning.—G. D. SHEARER.

STEYN, D. G. (1934). **Rapid Methods of Diagnosing Hydrocyanic (Prussic) Acid and Arsenical Poisoning Under Field Conditions.**—*J. S. Afr. vet. med. Ass.* **5.** 106-112. 4 figs. [1 ref.]

A detailed description is given of an outfit for the use of field veterinarians for the rapid diagnosis of both hydrocyanic acid and arsenical poisoning and to avoid the delay entailed in sending specimens to the laboratory for diagnosis. A rapid test for arsenic is described which enables as small a quantity as 0·05 mg. of

arsenic to be detected. Only fluid materials could be tested by this method and not portions of organs such as liver. The sodium picrate method was used for the determination of presence of hydrocyanic acid.—E. M. ROBINSON.

CLAWSON, A. B., BUNYEA, H., & COUCH, J. F. (1934). **Remedies for Cyanide Poisoning in Sheep and Cattle.**—*J. Wash. Acad. Sci.* **24.** 369-385. 3 tables. [12 refs.] [A summary appears in *N. Amer. Vet.* **15.** No. 12. p. 26].

Experiments on cattle and sheep with sodium thiosulphate, sodium nitrite, sodium tetrathionate and methylene blue for counteracting cyanide poisoning, showed that sodium thiosulphate was the most successful in sheep, protecting against 1·62 minimum lethal doses, while the best results with cattle were with a combination of sodium nitrite and sodium thiosulphate, which protected against two minimum lethal doses.—E. G. KNIGHT.

HADLEY, F. B., & KOZELKA, F. L. (1935). **Antidotes for Hydrocyanic Acid Poisoning.**—*Vet. Med.* **30.** 79-81. [13 refs.]

The mechanism of HCN poisoning is described and methods of prevention and cure given. The feeding of carbohydrate before allowing access to sorghum, millet, etc. ensures that there is glucose present in the blood to combine with the enzyme which liberates HCN from the cyanogenetic glucoside. Methylene blue and sodium nitrite have been found to raise the M.L.D. of hydrocyanic acid for sheep, but they are unsuitable for general use as antidotes. Sodium thiosulphate (hyposulphite), sodium tetrathionate and colloidal sulphur are definitely protective against cyanides, the freed sulphur combining with the cyanide.

Dihydroxyacetone is also valuable, but its action is of short duration. Dihydroxyacetone with sodium nitrite has a valuable synergistic action as an antidote against HCN. [The precise mode of administration in emergency cases in cattle is not given].—J. E.

SALOMON, S. (1935). Kartoffelvergiftung bei Enten. [**Potato Poisoning in Ducks**].—*Berl. tierärztl. Wschr.* **51.** 85-86.

Five ducks died and many birds in a large flock were severely affected after eating old cooked potatoes. No more cases were observed on discontinuance of the food. Bacteriological examination of the affected ducks was negative and no characteristic lesions were observed on *post-mortem* examination. The presence of solanine could not be demonstrated chemically. The author goes on to discuss whether solanine or some other substance is the cause of poisoning by potatoes. —G. D. SHEARER.

GÜNTHER, G. (1935). Die neue Giftverordnung. [**The New Poisons Order (Austria)**].—*Wien. tierärztl. Mschr.* **22.** 12-15.

Revised Dangerous Drugs Regulations were published in December, 1934, amending those issued in 1928. The new rules follow the recommendations of the International Opium Convention of 1925 and the list of drugs and the rules concerning their supply are similar to the British Dangerous Drugs Regulations. The author recommends Austrian veterinarians to dispose of their present supplies of dangerous drugs and not to stock them in future. By sending the client with a prescription to a pharmacist all the harassment of special lock-up cupboards, registers, labels, etc. will be avoided.—F. BULLOCK.

FITCH, C. P., BISHOP, Lucille M., BOYD, W. L., GORTNER, R. A., ROGERS, C. F., & TILDEN, Josephine E. (1934). **" Water Bloom " as a Cause of Poisoning in Domestic Animals.**—*Cornell Vet.* **24.** 30-39. 1 fig. [12 refs.]

Various outbreaks of poisoning are described in cattle through drinking water contaminated with green algae (*Microcystis flos aquae* and *Anabaena flos aquae*). Experiments showed that small laboratory animals could be killed by feeding very small amounts of the fresh algae. On drying, however, the algae lost their toxicity *per os* although they were still poisonous on intraperitoneal injection. In guinea pigs, the time of death could be varied from seven to 12 minutes according to the amount administered. Chemical investigation into the nature of the poison only indicated that it was an organic compound.—G. D. SHEARER.

BRUMPT, E. (1933). Paralysie ascendante mortelle expérimentale du chien par piqûre de la tique australienne : *Ixodes holocyclus*. [**Paralysis Produced Experimentally in the Dog by the Bite of the Australian Tick** *I. holocyclus*]. —*C. R. Acad. Sci. Paris.* **197.** 1358-1361. 6 figs.

The morphology of *I. holocyclus* is noted and a fatal case of acute progressive paralysis in a dog following the bites of two of these ticks is described, the ticks having been sent from Australia.—E. J. PULLINGER.

BAERG, W. J. (1934). **Some Poisonous Arthropods of Southwestern Mexico (Chilopoda and Arachnida).**—*Ann. ent. Soc. Amer.* **27.** 527-532. [3 refs.] [Copied *verbatim* from *Rev. appl. Ent.* **23.** 106].

During August and September 1932, the author collected a number of scorpions, tarantulas, centipedes and black widow spiders (*Ladrodectus mactans*, F.) from various regions of Mexico. Tests in which certain of these Arthropods were allowed to bite rats showed that *Centruroides elegans*, Thorell, and *C. elegans* var. *limpidus*, Karsch, were dangerously poisonous. The bites of *L. mactans*, with which no test was made, are also reported by the natives to be dangerous.

PHYSIOLOGY.

RODOLFO, A. (1934). **The Physiology of Reproduction in Swine. II. Some Observations on Mating. III. Preliminary Study of the Morphology of the Spermatozoa.**—*Philipp. J. Sci.* **55.** 13-18 and 165-175. 3 figs., on 1 plate, 7 tables. [5 refs.] [For abst. of previous article of this series, see this *Bull.* **4.** 780].

II. It appears that sexual attraction does not influence the mating behaviour of a boar, for the presence of a sow not on heat or even a dummy sow is sufficient to stimulate a boar to mount. Complete ejaculation may be obtained by means of an artificial vagina provided that the latter is soft, warm and exerts a pressure on the penis. During coitus, the distal end of the penis rotates forwards in an anti-clockwise direction ; after some of the semen has been excreted the distal end of the penis is withdrawn a little and rotated clockwise. These movements are repeated until all the spermatozoa have been ejected. Immediately before and after the complete ejaculation of spermatozoa a large volume of an alkaline straw-coloured viscid fluid is secreted and at the end of coitus, a mucilaginous substance which acts as a vaginal plug is ejected. An examination of the genital organs of sows shows that the anti-clockwise movement of the penis enables the boar to eject the semen directly into the cervix.

III. Three types of spermatozoa, which may be distinguished by the presence or absence of a protoplasmic drop on the flagellum, have been observed in boars' semen. Spermatozoa with no protoplasmic drop are most numerous in the ordinary semen and are actively motile ; those in which the drop occurs a little way down the tail are most numerous in semen obtained from the caudal portion of

the epididymus and are also motile, and those in which the drop occurs immediately below the head are most numerous in the semen obtained from the proximal portion of the epididymus and are non-motile. It appears that these types represent stages in the development of the mature spermatozoa, but their relative numbers in the ejaculated semen remain fairly constant even on intensive mating.
—J. A. NICHOLSON.

GONZAGA, A. C., & VALENZUELA, A. (1934). **Preliminary Studies on the Preservation of the Semen of the Stallion.**—*Philipp. J. anim. Indust.* **1.** 371-377. 2 tables. [10 refs.]

In this study two kinds of semen were used, viz. ejaculated semen and semen obtained direct from the epididymes of castrated stallions. With the former it was found that when stored at low temperatures the spermatozoa remained alive from 30 to 96 hours according to the diluting fluid used. With the latter, however, spermatozoa were found to maintain their vitality for several days.—C. DAVENPORT.

QUINLAN, J. B. (1935). **Recent Observations on Sex Physiology in Sheep.**—*S. Afr. med. J.* **9.** 7-10.

The writer has been carrying out experimental work on infertility in domesticated animals since 1926. The studies included the influence of vasectomy on skeletal development and wool production in sheep. Gland grafting was undertaken, but the results of VORONOFF could not be confirmed. Very extensive studies of the ovarian cycle of ewes were made, in which were many interesting observations, not previously recorded. The viability of spermatozoa and their penetrative ability in sheep were studied, and it was found that spermatozoa could penetrate to the abdominal extremity of the Fallopian tubes within six hours after coitus. The morphology and vitality of spermatozoa of infertile rams was studied. In conclusion, the modern methods used for artificial insemination in Russia were described.—E. M. ROBINSON.

VOGT, V. (1935). Vergleichende Untersuchungen und Betrachtungen über die Sexualhormone bei unseren Haustieren. [**The Sex Hormones of Domestic Animals**].—*Arch. wiss. prakt. Tierheilk.* **69.** 16-23. 1 table. [23 refs.]

The author reviews certain aspects of the present knowledge concerning sexual hormones and has turned his attention to the variations in their production by domestic animals. He found that anterior pituitary gland from calves and goats produced oestrus when transplanted into immature female mice whereas similar material from foals, puppies, mares and sows was without effect. An examination of the fluid contained in ovarian cysts from mares revealed the presence of oestrin ; it was also possible to demonstrate the presence of folliculin in the allantoic fluid of ruminants. Transplanting portions of the pineal gland from a goat into three-week-old mice inhibited the onset of oestrus. Sex hormones cannot be found in the blood or urine of geldings, oxen, sheep or goats, but folliculin is present in the blood and urine of stallions and boars. Recent work has shown that folliculin and the testicular hormone are closely related substances and the author suggests that folliculin may be produced in the body as the result of the breakdown of the testicular hormone.—J. A. NICHOLSON.

KOCH, W. (1934). Ueber den Einfluss von Prolan auf die Laktation ; Versuche an Rindern und Schafen. [**Influence of Prolan on Lactation : Tests on Cattle and Sheep**].—*Z. Zücht. B.* **30.** 115-128. [56 refs.]

There are three processes associated with milk secretion, the growth and

development of the mammary glands during puberty and pregnancy and the onset and continuance of lactation. The first two are undoubtedly influenced by hormones whilst the third is not. An examination of the results obtained by earlier workers suggests that pituitary hormones are associated either directly or indirectly with milk secretion and the author wished to determine whether it is possible to increase the milk yield by giving lactating animals a single injection of prolan. Preliminary experiments on cows and ewes did not yield encouraging results and a more detailed study of the effect of prolan was carried out on a series of cows. 125 rat units of prolan, however, produced no appreciable change in the quantity or quality of the milk, the results being unaffected by pregnancy, the stage of the oestrus cycle or the period of lactation.—J. A. NICHOLSON.

COULOUMA, P., BASTIEN, & DAUCHY. (1935). L'innervation des surrénales chez l'homme et le chien. [**Innervation of the Adrenal Glands in Human Beings and Dogs**].—*Rev. Path. comp.* **35.** 450-485. 19 figs. [11 refs.]

The authors describe and illustrate five types of innervation of the adrenal glands in human beings and four types in dogs. The types are distinguished by variations in the positions of the fibres which form the nerve groups of pedicles supplying the glands. The innervation of the two glands is essentially the same, except that the right gland usually receives a greater number of nerves than the left. Both in human beings and dogs, each adrenal receives about 30 nerves collected into two groups, a superficial or adrenal-solar and a deep or adrenal-splanchnic. The superficial group in human beings is divided into three branches, whereas in dogs this group is made up of only two branches, superior and inferior. These nerves enter the gland on the posterior surface in the neighbourhood of the internal edge. The deep group of nerves is formed by about a dozen nerves which arise from the adrenal ganglion on the large splanchnic nerve. They enter the gland on the posterior surface away from the internal edge. Occasionally in dogs the branches of the superficial nerve group are anastomosed and sometimes the inferior branch sends branches to the kidneys. The deep group of nerves contains fibres from the solar branch of the vagus nerve, so that the adrenal glands have a vago-sympathetic nerve supply.—J. A. NICHOLSON.

BOURNE, G. (1934). **A Study of the Golgi Apparatus of the Adrenal Gland.**—*Aust. J. exp. Biol. med. Sci.* **12.** 123-139. 59 figs. [21 refs.]

Two distinct types of Golgi apparatus (an area of argentophilic and osmophilic cytoplasm occurring in the cells of animals and plants) have been found in the adrenal cortical cells, the compact and the diffuse, of opossums, an Australian flying phalanger, and young albino rats, from new-born up to three weeks old. The diffuse type is regarded as the hypertrophied form of the compact type.

The cells of the zona reticularis are shown to possess a Golgi apparatus which takes the form of either a mass of granules or a condensed black knot closely associated with the nucleus. This fact is in agreement with the view that the zona reticularis is a zone of degenerating cells.

It is concluded that the Golgi apparatus and vitamin C are jointly concerned in the production of lipoid material, which may be the cortical hormone, in the cells of the adrenal cortex.—E. MUNCH-PETERSON.

HARINGTON, C. R. (1935). **Biochemical Basis of Thyroid Function.**—*Lancet.* **228.** 1199-1204. 3 figs. [28 refs.]

A brief history is given of the evolution of iodine therapy in thyroid diseases. During iodine insufficiency the colloid of the gland is used up ; this is followed by

a glandular hyperplasia. The insufficiency of iodine may be due to environmental shortage, unsaturated fats in the diet, or the extra demands made during pregnancy. In goitres in human beings there is a tendency to nodular enlargement of the gland, followed by atrophy and myxoedema. In animals the enlargement is uniform, and myxoedema and cretinism as seen in human beings do not obtain. The final proof of endemic goitre being due to iodine deficiency is found in the success resulting from prophylactic iodine therapy.—HENRY DRYERRE.

ECKLES, C. H., PALMER, L. S., GULLICKSON, T. W., FITCH, C. P., BOYD, W. L., BISHOP, Lucille, & NELSON, J. W. (1935). **Effects of Uncomplicated Phosphorus Deficiency on Estrous Cycle, Reproduction, and Composition of Tissues of Mature Dairy Cows.**—*Cornell Vet.* **25.** 22-43. 9 tables. [24 refs.]

Eight cows were fed on a ration composed of hay with a low phosphorus content, corn, barley and chalk. This diet was deficient in P but otherwise complete. The amount of the diet was regulated according to the milk yield. The blood inorganic P fell to about half the normal value. One animal died at the end of four months from excessive aphosphorosis. The remainder were slaughtered after being 18 to 32 months on the diet. Some of the cows failed to consume their full nutrient requirements. Most of the animals had a curtailed lactation period. There was no evidence that the P deficiency affected the oestrous cycle of the animals, but there was a reduction in their fertility. Analyses of the bones showed that, as compared with normals, there was a reduction of the ash content and a lowering of the $Ca_3PO_4/CaCO_3$ ratio. It is concluded that the disturbances in oestrum and the low calf crop found in animals grazing in P-deficient areas are due to complicated nutritive deficiencies, and not to P deficiency alone.—H. D.

GRAF, H. (1933). **Chemical Blood Studies. I. Comparative Studies on Blood, "Laked" and "Unlaked" Blood Filtrates of Animals in Health and Disease, with Particular Reference to Methods and Technique employed.**—*Onderstepoort J. vet. Sci.* **1.** 269-278. [24 refs.]

WILKEN-JORDEN, T. J., & GRAF, H. (1933). **Chemical Blood Studies. II. A Contribution to the Determination of Urea in Animal Blood Filtrates ("Laked" and "Unlaked").**—*Ibid.* 279-283. 5 tables, 1 chart. [9 refs.]

GRAF, H. (1933). **Chemical Blood Studies. III. Comparative Studies on "Laked" and "Unlaked" Blood Filtrates of Sheep in Health and during "Heart-water"** (*Rickettsia ruminantium* **Infection) and Bluetongue (Catarrhal Fever). IV. Comparative Studies on "Laked" and "Unlaked" Blood Filtrates of Horses in Health and during Horse-Sickness** (*Pestis equorum*). **V. Comparative Studies on "Laked" and "Unlaked" Blood Filtrates of Bovines in Health and during Anaplasmosis** (*A. marginale* **Infection) and Piroplasmosis** (*P. bigeminum* **Infection).**—*Ibid.* 285-334, 335-369 and 371-401. 9 figs., 44 tables, 44 charts. [45 refs.]

These five papers deal with blood levels in health and disease, in respect of total nitrogen, non-protein nitrogen, total creatinine, urea, uric acid, amino acids, sugar and haemoglobin. Protocols are numerous and of a nature which necessitates consultation in the original text, but the general trend of the data may be indicated.

The first paper deals with technique and the general plan of investigation. The second discusses the influence of pH on urease activity in the determination of blood urea. The third deals with changes in sheep's blood during the pre-infection period, the incubation period, the hyperthermic reaction and the convalescent period, of *R. ruminantium* infection and catarrhal fever. Considerable

changes are recorded, varying with the severity of reactions. The fourth paper deals with 14 cases of horse-sickness. Alterations in nitrogen partition were not pronounced. The fifth paper records alterations in practically every constituent determined, in cases of *A. marginale* infection. *Babesia bigemina* infection showed increase in all nitrogenous fractions and in sugar, associated with the period of maximum erythrocyte destruction.—H. H. GREEN.

HOLZAPFEL, C. R. (1934). **Studies in Mineral Metabolism. XXVII. Modifications of the Methods Used at Onderstepoort for the Determination of (A) Magnesium and Calcium; (B) Potassium in Grass Extracts.**—*Onderstepoort J. vet. Sci.* **2.** 115-122. 7 tables, 1 appendix. [5 refs.] [For abst. of previous articles of this series, see this *Bull.* **4.** 131].

This paper is entirely devoted to descriptions of modified technical methods for the determination of Ca and Mg in grass extracts and the effect of iron on the original determination is illustrated. The substitution of ammonia for sodium hydroxide for washing the precipitate of magnesium ammonium phosphate was found to be necessary.—E. M. ROBINSON.

BLOM, I. J. B. (1934). **Studies in Mineral Metabolism. XXVIII. Methods for the Micro-Determination of Iodine in Biological Material. XXIX. The Iodine Content of Foodstuffs in Relation to the Occurrence of Endemic Goitre in the Langkloof Valley.**—*Onderstepoort J. vet. Sci.* **2.** 123-130 and 131-138. 10 tables. [24 refs.] [For absts. of previous articles of this series, see this *Bull.* **4.** 131].

XXVIII. The three common methods for the micro-determination of iodine are discussed :– (a) dry oxidation in a closed system ; (b) the nickel dish method, and (c) the wet or acid oxidation method. It was shown that under the conditions specified the error in duplicate analyses did not exceed 20 per cent. Over 80 per cent. of the original iodine present could be recovered.

XXIX. Analyses were carried out on foodstuffs obtained from a goitre area where the inhabitants, owing to living in almost inaccessible valleys, are forced to rely upon locally grown foodstuffs. Comparisons were made with analyses of foodstuffs from non-goitrous areas. Such widely differing results were obtained that no fixed relationship could be established between the iodine content of foodstuffs and the incidence of goitre.—E. M. ROBINSON.

CUNNINGHAM, I. J., & JOSLAND, S. W. (1934). **The Determination of Magnesium in Blood Serum.**—*N.Z. J. Sci. Tech.* **16.** 28-29. 2 tables. [3 refs.]

The original method, employed by these authors, of determining Mg in blood, was the micromethod of Denis but, when checked against a gravimetric determination of Mg, the Denis method frequently gave results 30 per cent. lower than did the gravimetric.

The authors modified and improved Denis' method, the new method being published in this article. A table is included, showing the very close results of the colorimetric determination (Josland) as against the gravimetric (Cunningham).

Normals for different animals are given as follows, in mg. per 100 c.c. serum :– cattle, 2·3 ; sheep, 2·5 ; rats, 2·5 ; swine, 2·5 and grass tetany in cattle, 1·1.

—C. S. M. HOPKIRK.

DUNCAN, C. W., HUFFMAN, C. F., & ROBINSON, C. S. (1935). **Magnesium Studies in Calves. I. Tetany produced by a Ration of Milk or Milk with Various Supplements.**—*J. biol. Chem.* **108.** 35-44. 2 tables. [10 refs.]

Twenty calves which were raised on a ration of whole milk, either alone or supplemented by cod liver oil, parathormone or minerals (Mn, F, Si, Al, Fe, Cu), all died in tetany. The early symptoms were irritability and nervousness. The animals turned around in circles, lost their balance and went into convulsions, frothed at the mouth and salivated. The authors liken the symptoms to those of grass tetany. The calcium and inorganic phosphorus content of the blood were both normal. The Mg intake varied from 5·39 to 13·7 mg. per kg. body weight.

Particulars are given of an additional five animals, also on a milk diet with supplements, with high and low fat content, and with varying amounts of vitamin D. In these animals the blood Mg also was estimated. The Mg intake varied from 6·26 to 16·86 mg. (one case 38·42 mg.) per kg. body weight. All showed a hypomagnesaemia, and all manifested tetany. The Ca/Mg ratio in normal calf blood is 4 or 5 to 1, whereas in the cases studied the ratio was 8 or 10 to 1. The Ca and P of the blood kept within the normal range. Intermittent estimations of haemoglobin, blood sugar, plasma CO_2 and chloride showed no significant departure from the normal. It is inferred that in animals on a milk ration there is a failure in the Mg metabolism which prevents the animals from utilizing the available Mg, and that this partially explains why several investigators have been unable to raise calves to maturity on whole milk rations. There is no evidence in the paper that the rate of excretion of Mg was investigated.—Henry Dryerre.

McLean, F. C., & Hastings, A. B. (1935). **The State of Calcium in the Fluids of the Body. I. The Conditions affecting the Ionization of Calcium.**—*J. biol. Chem.* **108.** 285-322. 15 tables, 3 graphs. [52 refs.]

This paper deals with the physical chemistry of calcium in body fluids. The total Ca is estimated by the usual methods, but the Ca^{++} is determined biologically, using a frog-heart preparation. The ionization of Ca as affected by pH, magnesium, citrate, albumin to globulin ratio, and a limited range of temperature, was investigated. In general, the effect of these variables is small as compared with the effect of protein. If total calcium and total protein are known, Ca^{++} can be calculated. In the case of the rabbit and possibly some other herbivorous animals, the citrate content of the body fluids is sufficiently high to exert a quantitatively significant effect.—Henry Dryerre.

Little, W. L., & Mattick, Elfreida C. V. (1933). **The Calcium Content of Cow's Blood. Part II. (a) Calcium in the Blood of Parturient Heifers; (b) Effect of Injections of Parathyroid Extract, Irradiation, etc.; (c) Some Case Reports of Milk Fever.**—*Vet. Rec.* **13.** 1091-1097. 7 tables. [5 refs.]

Decrease of Ca and inorganic P of blood occurred at parturition. Irradiation had no effect on serum Ca. Intramuscular injection of parathyroid extract for several days before and after calving had no pronounced effect upon Ca level. Daily drenching with calcium compounds for nine to 12 days before calving did not prevent milk fever. In eight cases of milk fever total Ca was only once above 6 mg. per 100 c.c. of serum while diffusible Ca was never as high as 3 mg. Slow intravenous injection of calcium chloride solution induced rapid recovery from milk fever in all cases.—H. H. Green.

Burns, C. M., & Henderson, N. (1935). **Bone Composition in the New-Born Young of Some Species.**—*J. Physiol.* **83.** 46P-47P. [3 refs.]

In pups at birth there is in the bones a high inorganic salt content, particularly carbonate. This drops at first, and then gradually increases. In some cases the salt content remains high, indicating that material for bone formation is being

obtained from the food. Goats do not exhibit this early extra-uterine loss of bone salts. There is no support for the assumption that the composition of the blood is the most important controlling factor in bone formation.—HENRY DRYERRE.

BILLS, C. E. (1935). **Physiology of the Sterols, including Vitamin D.**—*Physiol. Rev.* **15.** 1-97. 8 tables. [30½ pp. refs.]

This is an admirable review of the literature dealing with a group of chemical substances whose importance in physiological reactions is being shown to be greater and greater as biochemical research proceeds. It deals with the distribution of the sterols in the animal and vegetable kingdoms, their biochemical relationships and their chemical structure. It discusses their origin, absorption and excretion both in plants and animals. Cholesterol, physiologically the most important sterol, is dealt with in greatest detail and the theory of the formation of gallstones, which states that " cholesterol stones are due to a faulty differential absorption of bile acids and cholesterol by the abnormal gall bladder mucosa ", is adequately reviewed. The physiological functions of the sterols in the animal organism are reviewed at length, and much of the largely presumptive evidence for their exaggerated importance in many reactions, such as the neutralizing of toxins, their protective action in anaphylaxis and their need by the developing embryo, is clarified and put in its proper proportion. The literature dealing with the formation of vitamin D by the action of light on the sterols is fully and well summarized. The review concludes with the details of the physiology of vitamin D. Its absorption, transport and elimination in the body is concisely explained. The controversy regarding its mode and site of action is related from an unbiased angle, and the author's opinion regarding the importance of the action of the gut and parathyroid gland in the absorption and excretion of calcium and phosphorus is well worth quoting :–" As for hormone and vitamin, major forces of the system, it is most satisfactory to regard them as acting together – complementing, supplementing and opposing each other as the occasion demands."

The whole review has been planned on a very clear but concise basis and the care taken over the bibliography, which is always the most important part of any review of scientific literature, will be understood when the author, in a footnote, states that every one of the references and cross references (they occupy 30 pages) has been verified.—JAMES STEWART.

TECHNIQUE.

DUDGEON, L. S., & BARRETT, N. R. (1934). **Examination of Fresh Tissues by the Wet-Film Method.**—*Brit. J. Surg.* **22.** 4-22. 6 figs., 4 tables. [9 refs.]

The advantages of this method are :– (1) the cells are very little damaged ; (2) the technique is simple ; (3) only a small amount of material is required, and (4) a quick diagnosis can be obtained.

TECHNIQUE.—Wipe the surface of the piece of tissue with a piece of gauze to remove blood and tissue fluids. Scrape the surface with a sharp knife and transfer the collected cells to a slide and smear as for a blood film. Fix in Schaudinn's fluid before drying occurs. The optimum period for fixation is 20 minutes, though two minutes will suffice. Transfer to methylated spirit, containing a few drops of tincture of iodine. Wash in distilled water and stain, preferably with Mayer's haemalum, counter-stained by weak eosin. Take through alcohols into xylol and mount in balsam.

The characters are given which distinguish malignant from benign tumour cells, and from normal cells in such preparations.

The method can be applied in the diagnosis of conditions other than tumours.
—A. BROWNLEE.

LAIGRET, J., & DURAND, R. (1935). Technique simple de culture des microbes anaérobies. [**A Simple Technique for Cultivation of Anaerobes**].—*Arch. Inst. Pasteur Tunis.* **24.** 122-123. 1 fig.

After sowing, the cotton wool plug is flamed and pushed down the tube as far as possible without touching the medium. A rubber stopper is then loosely fitted, and the tube is then placed inside another tube, which is exhausted by a vacuum pump. When a vacuum is obtained, the stopper of the outer tube is quickly removed and air rushing in tightly stoppers the inner tube and a vacuum is maintained in it. The water of condensation should be previously removed by drying, otherwise the medium may separate from the glass.—A. BROWNLEE.

JAMES, W. E. (1934). **A Basal Medium for the Primary Isolation of Pathogens. (A Quickly Prepared Medium including Accessory Growth Factors from Fish Roe or Quahaugs.).**—*J. Bact.* **28.** 323-332. 4 plates, 1 table. [4 refs.]

The author defines the accessory growth factors concerned as those substances, soluble in water, thermostable at 100°C. and readily adsorbed from solution by filtration through paper or cotton wool which, when added to ordinary culture media, render those media more favourable for the growth of bacteria. As a source of these factors, 5 per cent. fish roe, or 20 per cent. quahaug [a kind of clam] as an infusion in the medium resulted in growths equal or superior to those on blood agar. Streptococci grown on fish roe or quahaug medium plus defibrinated blood give a haemolytic reaction that is quicker and sharper than that obtained when grown on Brown's blood agar.—A. BROWNLEE.

CORONEL, A. B. (1934). **Method of Keeping Stock Cultures and Viruses in the Research Laboratory of the Bureau of Animal Industry.**—*Philipp. J. anim. Indust.* **1.** 393-401. 2 tables.

It was found that various types of meat infusion agar were the best for the preservation of stock cultures of Gram-positive cocci and the colon-typhoid group, liver agar for salmonella and *Brucella abortus* organisms and glycerin agar or egg medium for mycobacteria. The most suitable medium for anaerobic organisms was brain-liver broth.

With regard to viruses, it was noted that in fowl plague the salivary secretion stored in sealed tubes remained viable up to five months, avian pox viruses in dried scabs for six to 12 months, swine fever virus in defibrinated blood preserved with 0·5 per cent. phenol for two months and rabies virus in 50 per cent. glycerin for one year (calf brain).—R. E. GLOVER.

DURAND, R. (1935). De l'utilisation de la glycérine pour la conservation et la purification des virus. [**The Use of Glycerin for the Preservation and Purification of Bacteria**].—*Arch. Inst. Pasteur Tunis.* **24.** 124-129. [1 ref.]

Various bacteria (details are given) were suspended in glycerin – pure and also diluted 1 : 2 and 1 : 10 with saline – and exposed to its action at 37°, 20°, 3° and -12°C. In pure glycerin all the bacteria tested, except spore-bearers, were destroyed in a comparatively short time (one to four days) at 37°C.; they lived longer at 20°C. and they all lived for months at 3° and -12°C. Generally, bacteria exposed

at 37° and 20°C. were killed after similar intervals in the 1 : 2 glycerin and lived rather longer in the 1 : 10 dilution. They all survived for months in the diluted glycerin when kept at –12°C.—A. Brownlee.

Elford, W. J., & Ferry, J. D. (1935). **The Calibration of Graded Collodion Membranes.**—*Brit. J. exp. Path.* **16.** 1-14. 4 figs., 3 tables. [5 refs.]

In order to determine the average pore diameter (A.P.D.) of a particular collodion membrane, it is necessary to determine (1) its thickness ; (2) the rate of flow of water (R.F.W.), which is the volume of water which flows through 1 sq. cm. of membrane area in one minute at 20°C. under 100 cm. of water pressure, the membrane thickness being 0·1 mm., and (3) the " specific water content " (S.W.C.), which is the volume of water contained in 1 c.c. of membrane when the pores are full of water.

The technique is described for measuring the thickness of the membrane, the S.W.C. and the R.F.W., and diagrams of the apparatus used for determining the R.F.W. are shown. Formulae for the calculation of the A.P.D. are given.

A discussion is made on the probable arrangement of pores in these membranes. The pores may not be circular but are more probably polygonal with a hexagonal arrangement. In all membranes, except those in which the specific water content is very small, the pores probably intercommunicate, but the porosity of the film is probably greatest in the direction at right angles to the surface, with parallel capillaries perpendicular to the surface.

In membranes in which the S.W.C. is small, it is probable that the pores are independent.

The factor which enables the A.P.D. of the limiting membrane to be converted into terms of particle size has been determined from the results of experiments involving the filtration of particles of known particle size.—A. Brownlee.

Lapage, G. (1933). **The Cultivation of Infective Nematode Larvae on Cultures of** *Bacillus coli.—3rd Rep. Dir. Inst. anim. Path. Univ. Camb., 1932-1933.* pp. 237-271. 1 table. [39 refs.]

This is a detailed account of the method which the author has employed for the cultivation of the free-living larval stages of the parasitic nematodes of sheep. It is based on the method described by McCoy [(1929). *Amer. J. Hyg.* **10.** 140.], the principal difference from McCoy's method being that the strain of *Bact. coli* with which the agar was inoculated was originally isolated from the intestines of the first parasitic stages of the nematode larvae themselves. The infective larvae of *Trichostrongylus* sp., *Ostertagia* sp. and *Chabertia ovina* from the sheep, and also *Graphidium strigosum,* and *Trich. retortaeformis* from the rabbit were successfully reared on this pure culture of *Bact. coli.*

It was also observed that bacteria taken into the intestine of the free-living larval stages from faecal or bacterial cultures can remain alive there until after the larvae have entered the host, and have passed through the next ecdysis ; it is inferred that they can, therefore, introduce living pathogenic bacteria into the tissues of the host.—E. L. Taylor.

Schmid, F. (1934). Beitrag zur Technik der Kotuntersuchung, insbesondere zur Untersuchung von Hühnerkot. [**The Technique of Faecal Examination, especially of Fowl Faeces**].—*Tierärztl. Rdsch.* **40.** 467-469. [14 refs.]

A brief review is given of the methods which have been advocated by various authors for the concentration of the eggs and larvae of nematodes in the examination of faeces for evidence of infestation. Schmid's own method is to mix the

faeces with water, allow the mixture to stand in a tube for one or two hours, then to pour off the supernatent fluid and add a heavy solution. The tube is then either allowed to stand for 15 to 25 minutes or spun round in the centrifuge for one minute, after which a drop containing the floated eggs is removed from the top with a wire loop and placed on a slide for examination under the microscope. A heavy solution of potash [presumably potassium carbonate], prepared by dissolving one and a half parts of potash in one part of water, is thought to have decided advantages over sugar, salt, waterglass or calcium chloride solutions, in that the eggs of the liver fluke and the larvae of lungworms can also be floated. The specific gravity of the solution is 1·56 ; where search is being made for the eggs of the liver fluke the solution should be used undiluted ; for ordinary nematode eggs, however, it may be used diluted with an equal quantity of water. [A trial of this method shows that with the faeces of some animals, at least, a large amount of vegetable debris is also floated to the top of the solution].—E. L. TAYLOR.

I. BECH, J. L. (1934). Udtagelse af Lungeslimprøver hos Kvaeg. [**The Collection of Lung Mucus from Cattle**].—*Maanedsskr. Dyrlaeg.* **46.** 322-334. 5 figs. [2 refs.]

II. PLUM, N. (1934). Bemaerkninger i Anledning af foranstaaende Meddelelse om Udtagelse af Lungeslimprøver. [**Observations on the Examination of Lung Mucus collected with Bech's Instrument**].—*Ibid.* 335-339. [2 refs.]

I. The author has constructed a tube which is introduced, *via* the mouth, into the trachea of cattle. When it is *in situ* in the trachea, a plug covered with gauze, contained within the canula, is pushed out into the main bronchi and moved backwards and forwards a few times. The plug is then removed and the whole apparatus is withdrawn. By this method it is possible to obtain lung mucus suitable for laboratory examinations.

II. The author maintains that there is no doubt that by means of Bech's apparatus specimens of mucus can be obtained which are more likely to give safer results in laboratory examination than are specimens obtained in any other manner. A direct comparison with other methods has not yet been carried out. [See, however, this *Bull.* **4.** 489.—Ed.].—H. C. BENDIXEN (COPENHAGEN.)

KRISCH, O. (1935). Erfahrungen bei der Kastration weiblicher Schweine.—[**Ovariectomy of Gilts.**]—*Wien. tierärztl. Mschr.* **22.** 1-12. 3 figs. [7 refs.]

This is a comprehensive and instructive article by a veterinarian living in a district where the operation is extensively practised. The account of the surgical details is good.—J. E.

MISCELLANEOUS.

DUDGEON, L. S., & BOND, L. T. (1934). **On the Digestive Action of Leucocytes, Pus and Body Exudates.**—*J. Hyg., Camb.* **34.** 99-117. 3 tables. [29 refs.]

The digestive action of samples of pyogenic pus, sterilized by heating at 60°C. for four hours, and of their glycerin extracts, was tested on inspissated blood serum, gelatine, milk, egg and hydrocele saline, and it was found that, although digestive action took place on all these media to varying degrees, the glycerin extracts were more active than the specimens of pus alone. The clotting of milk took place at 37°C. if there were added to the pus, or glycerin extracts of pus, various strains of *Salmonella typhi* (formerly *Bact. typhosum*), *S. paratyphi* A, B and C, *S. enteritidis* (formerly *Bact. enteritidis* Gärtner) and *Bact. shiga.* Human

milk, however, did not clot with pus and these organisms. The digestive action of pus was completely destroyed by heating at 80°C. for 20 minutes or 100°C. for ten minutes. Serum exudates obtained after centrifugation of pus usually manifested the same digestive action, but several were inhibitory. Examination of tuberculous pus, obtained from abscesses and from pyo-pneumothorax, showed that, while some behaved like pyogenic pus, others showed no digestive action. White cells from the blood of several cases of leucaemia were investigated in the same manner as the pus. The cells of chronic myeloid leucaemia acted in every way like pus, but those of chronic lymphatic and those of acute leucaemia were quite inactive, while those in which the leucaemia was of a myeloblastic termination gave only a weak digestive reaction. The inhibitory action of blood serum and various body fluids on the clotting of milk was confirmed.—JAMES STEWART.

FUCHS. (1935). Die Bedeutung der künstlichen Besamung der Rinder für die Bekämpfung der Deckinfektionen. [**Artificial Insemination in Cattle**].—*Dtsch. tierärztl. Wschr.* **43.** 230-231.

An apparatus which can be used as an artificial vagina is briefly described. In the experiments detailed below, mixed semen from three bulls was obtained and was diluted at 1 : 5 with sterile saline, 1·5 to 2 c.c. of this dilution being instilled into the os uteri of the cow.

In an attempt to stem an outbreak of *Trichomonas* abortion, which was being spread by the bulls during coitus, a herd of 98 cows was treated by artificial insemination. The cows were inseminated when on heat or when they appeared to be on heat. Of these cows, 72 became pregnant after artificial insemination. Of the remainder, 20 showed derangement of the oestral cycle. Excluding the last named 20 cows from consideration, it is concluded that 94 per cent. of 78 normal cows were successfully fertilized.—E. J. PULLINGER.

STANG, V. (1935). Ueber Füttern und Tränken von Tieren während des Bahnversandes. [**The Watering and Feeding of Animals Travelling by Rail**].—*Dtsch. tierärztl. Wschr.* **43.** 193-196.

Experiments over a long period show that animals do not suffer in health from prolonged fasts of 30 hours or over. [It does not seem right that water should be withheld from animals in transit for so long a period, particularly during the hot weather]. Their behaviour does not indicate that they suffer unduly from hunger and thirst ; after a long journey by rail they will often eat and drink very little and lie down to rest, not showing much appetite till the next day. It is not always necessary that they should be unloaded at the halts for feeding and watering ; in very cold or extremely hot weather it may do them more harm than good to be taken outside. In crowded wagons, however, room must be made for all the animals to get food and drink.

Hay is the most suitable food for cattle, horses and sheep ; potatoes or turnips for pigs ; and calves should get a little warm milk. All water should be warmed slightly in cold weather. No animal should be allowed to drink when in a heated condition.—R. G. LINTON.

—. (1935). **International Biological Standards.**—*Lancet.* **228.** 685-686.

The total number of international biological standards is now 22 ; they comprise standards for nine antisera, old tuberculin, insulin, pituitary (posterior lobe) extract, the oestrus-producing hormone, three substances of the arsphenamine group, four vitamins, ouabain and digitalis. This leading article deals mainly with the origin, aims and activities of the " Permanent Commission on Biological Standardisation, of the Health Organisation of the League of Nations." The

main object of the commission is to secure international agreement as to the standards and units adopted for potent therapeutic agents, the activity of which cannot be adequately assayed or controlled by chemical means, in order that the activity of all preparations of this class, in whatever country they may be produced, may be expressed in a common notation and based upon the same standard and unit. With the adoption of the same standards and units in all countries, laboratory and clinical investigations can be placed on a reasonably quantitative basis and the results of such investigations throughout the world can be correlated. The procedure of the commission in establishing standards for international use is explained and the arrangements made by the commission for their storage at central institutions and their subsequent distribution to laboratories, hospitals, and research workers are outlined.—JAMES STEWART.

SCHMALTZ, R. (1935). Der tierärztliche Stand und seine Fakultäten. **[Position of Veterinary Science and Veterinary Faculties in Germany].**—*Berl. tierärztl. Wschr.* **51.** 14-15.

The Veterinary High School at Berlin has, under the new educational régime in Germany, been incorporated in the University of Berlin, not as a veterinary medical faculty, but as a veterinary division of an agricultural faculty. Schmaltz considers this decision to be a retrograde step detrimental to the status of the profession. Veterinary medicine is a part of medicine rather than of agriculture and can only give its best to the State if it is independent of agriculture. Its main services are the control, in behalf of the public health, of contagious diseases, the inspection and certification of food-stuffs of animal origin, and only in the third place private veterinary practice. Schmaltz therefore expresses the hope that the decision will be amended and the Berlin school given its rightful place as an independent faculty of the University.—F. BULLOCK.

LEBER. (1935). Das Veterinärwesen Chinas. **[Veterinary Affairs in China].**—*Tierärztl. Rdsch.* **41.** 49-54 and 71-75.

Three years ago Leber was appointed by the Chinese National Government to reorganize and improve the standard of the army veterinary service in China. These articles give a comprehensive description of the state of the livestock in the country, the extent of epizootic diseases, and the control, or rather lack of control, over the production of animal foodstuffs. There is in general no private veterinary practice in China, but in some districts there are a few graduates of the Pekin Veterinary College who practise the old Chinese methods of treatment. A few Chinese veterinarians who have been trained abroad are employed in abattoirs in Shanghai and Tsingtau. In cities with a foreign population there are even American and European veterinarians.

Before Leber's arrival no attempt had been made to control diseases such as glanders, rinderpest, anthrax, sheep pox, etc. In one cavalry regiment of 700 horses which he inspected, he found 113 horses suffering from glanders. In 15 months another cavalry brigade had lost 700 out of 1,600 horses from the same disease. The ignorance of the Chinese veterinarians is incredible, but their lack of medical knowledge is explained by the fact that there has never been any opportunity in China for them to acquire such knowledge. The teachers at the Pekin college were trained in Japan, but the whole organization is out of date. Only theoretical instruction is given in medicine, surgery, anatomy, pathology, bacteriology, shoeing and breeding, and its purpose is to train army veterinarians only. Since 1932, however, Prof. EBERBECK, a German teacher, has been employed at the college and supplies of instruments and medicaments have been obtained

from Germany. The course is supposed to last four years, but on account of financial stringency only a two years' course is given.

Leber claims to have been able to lay the foundations of a complete reorganization of veterinary science in China. Before he left he had completed the preliminary arrangements for a new veterinary high school at Nanking.—F. BULLOCK.

KADLETZ, M. (1934). Ueber die Galoppbewegung und von einem neuen Hilfsmittel zu deren Erkennung: Drehscheibe. [**The Gallop: New Method of Analysing its Mechanism**].—*Tierärztl. Rdsch.* **40.** 775-779. 9 figs. [8 refs.]

According to Kadletz nothing very definite is known of the actual movements of the limbs of the horse during the gallop. The new method of analysing the mechanism of the gallop now described is based on the use of a series of rectangles split at their diagonals so as to make triangles, together with lines and points to represent each foot. By a series of circles with a small outline triangle for the near fore, a dark triangle for the off fore, an outline circle for the near hind, and a dark circle for the off hind, the complete cycle is traced. It is difficult to convey the conclusions of the article without reference to the diagrams, from one of which it would appear that, starting with all legs clear of the ground, the off hind goes down (one down), then the off fore (two down), then the near hind (three down). The off hind is then lifted and the near fore put down almost simultaneously (still three down) and finally the off fore, near hind and near fore are lifted successively and the horse loses contact with the ground.—A. W. N. PILLERS.

OFFICIAL AND OTHER REPORTS.

DUTCH EAST INDIES. (1935). Jaarverslag van den burgerlijken veeartsenijkundigen Dienst over 1933. B. Veeartsenijkunding Instituut, Buitenzorg, Java. [**Annual Report of the Veterinary Institute, Buitenzorg, Java for 1933**]. [BUBBERMANN, C.]—pp. 110. 1 fig., 14 tables. [24 refs.] Batavia: Landsdrukkerij. [4to].

In March, 1933, the Institute completed its first 25 years' activity and at the end of the year it was combined with the Dutch East Indian Veterinary School, some of its senior staff members becoming part-time teachers.

GENERAL DIAGNOSIS.

The results are mostly statistical. Work with cassava [see report for 1932 – this *Bull.* **4.** 691.] failed to show any difference in toxicity between plants obtained from different places, but that toxicity was greatest at the end of the hot season.

Condensed reports on the work on stephanofilariasis, ovine peristomatitis, bacillary osteomyelitis of buffalo and anaerobic infection of domestic animals [all abstracted as separate articles in this *Bull.*] are also given.

With reference to the combined treatment of surra and anaplasmosis in ruminants by " naganol " and " trypaflavine ", it is stated that these drugs must not be mixed for injection in a single dose, as they form an orange precipitate.

It is also emphasized that " naganol " solutions must be very carefully prepared. Deaths have followed the injection of roughly-made solutions.

SERO-DIAGNOSIS.

Two diseases of buffalo, lepra bubalorum [this *Bull.* **5.** 402.] and a peculiar form of tuberculosis were studied. The identity of the organism from the latter was not determined, as it proved difficult to grow in culture.

DEPARTMENT FOR THE PREPARATION OF SERA AND VACCINES.

The results of vaccination against haemorrhagic septicaemia and anthrax are given in detail, together with short notes on other diseases.

ZOOLOGICAL DEPARTMENT.

A list of worms, arthropods and insects collected is given.—J. E.

BOOK REVIEWS.

LACHENSCHMID, B. (1935). Praktikum der tierärztlichen Schlachtvieh- und Fleischbeschau. **[Veterinary Inspection of Food Animals while Alive and after Slaughter].** pp. viii + 262. 14 figs. Stuttgart : Ferdinand Enke. [8vo] [RM.8.50].

This book is intended as a guide and reference book to German veterinarians engaged in meat inspection. It is written chiefly for the practitioner holding a part-time appointment. [Private practice combined with meat inspection is common in Germany]. It gives instructions as to condemnation of carcasses laid down by the German laws on Meat Inspection and Animal Diseases, and their amendments. It also serves as a general instructional guide, and, to non-German readers, it should be useful for comparing the German regulations with those in use elsewhere. The book is very well printed on good paper.—J. E.

FOLIN, O. [Hamilton Kuhn Prof. Biol. Chem., Harvard Med. School]. (1934). **Laboratory Manual of Biological Chemistry.** pp. x + 368. 4 figs., 7 tables, 5 charts. [5th Edit.] New York & London : D. Appleton-Century Company, Inc. [8vo] [12s. 6d.]

This is the fifth edition of the well-known practical text-book of biochemistry used in the medical school of Harvard University, extensively revised. The first 195 pages deal with acidimetry and alkalimetry, nitrogen determination, catalysis, enzyme action, fats, carbohydrates, proteins, urine analysis and metabolism, blood, milk, bone and bile. The supplementary portion, pp. 201-365, is devoted wholly to urine and blood, includes some hitherto unpublished material and incorporates all the newer analytical methods devised in the author's laboratory and now extensively used for clinical and research purposes.—H. H. GREEN.

LEBLOND, C. P. [Docteur, Licencié ès sciences]. (1934). Recherches histochimiques sur la localisation et le cycle de la vitamine C (facteur antiscorbutique) dans l'organisme. **[Localization of Vitamin C in the Animal Organism].** pp. 171. 37 figs., 6 tables. [21 pp. refs.] Laval : Imp. Barnéoud. [8vo].

Part I of this voluminous monograph is a historical survey of the various theories regarding the chemical structure of vitamin C and an account of the more recent work which has proved it to be ascorbic acid.

In Part II the details of a histochemical method, elaborated by the author, for the detection of vitamin C in the organs, tissues and cells of the body are given. The basis of the method is the reducing action of vitamin C on silver nitrate. Employing this method, the localization of vitamin C throughout the body was studied. Its precise localization in the suprarenals, the male and female genital organs, the hypophysis and the liver was determined. It is concluded that intracellular localization takes place in the cytoplasm, but not in the nucleus and that the oxidation-reduction property of the cytoplasm may be due to its presence. The disappearance of vitamin C from the body tissues under deficiency conditions and the speed with which latent scurvy develops were shown. Finally the whole cycle of vitamin C in the body was carefully determined in vitamin C-deficient animals ; its absorption by the intestinal epithelium, its passage along the blood vessels, its accumulation in the liver, its localization in the various organs and tissues and its final elimination in the urine by the renal cells. An extensive bibliography of recent work on vitamin C is appended.—JAMES STEWART.